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INVESTIGATION INTO THE DEPTH OF CURE

OF

RESIN-MODIFIED GLASS-IONOMER RESTORATIVE MATERIALS

by

Howard W. Roberts, DMD

A Dissertation submitted to the Faculty of the
Graduate School, Marquette University,
in Partial Fulfillment of
the Requirements for
the Degree of
Master of Science

Milwaukee, Wisconsin
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ABSTRACT

This investigation involved an attempt at delineating the depth of cure of resin-modified glass-ionomer restorative dental materials. Samples of different thicknesses using Vitremer Core Material and Restorative (3M/ESPE), Fuji II LC (GC America), and Photac-Fil Quick (3M/ESPE) were evaluated as to solubility, Knoop hardness, and thermal analysis techniques that included specific heat determination as well as differential scanning calorimetry thermal scans. Specimens were evaluated at time periods that included immediately after fabrication, 24 hours, one week, one month, and at three months. Overall results found that the solubility method chosen for this investigation did not provide the necessary sensitivity for depth of cure analysis of resin-modified glass-ionomer restorative materials. Hardness and thermal analysis provided evidence of a continuing, post-photopolymerization reaction that resulted in increased hardness, specific heat, and thermal requirements over the storage times. Furthermore, the resin-modified glass-ionomer restorative materials demonstrated water storage behavior similar to conventional glass-ionomer materials, in that water gained by the materials became more bound as storage time increased. Individual instances were observed in which the physical properties of 3 mm thick specimens were similar to that observed of 2 mm specimens, however these findings were not consistent throughout the investigation. Based on the conditions of this study, it is recommended that resin-modified glass-ionomer restorative materials should not be cured in thicknesses greater than two millimeters.

ABSTRACT

This investigation involved an attempt at delineating the depth of cure of resin-modified glass-ionomer restorative dental materials. Samples of different thicknesses using Vitremer Core Material and Restorative (3M/ESPE), Fuji II LC (GC America), and Photac-Fil Quick (3M/ESPE) were evaluated as to solubility, Knoop hardness, and thermal analysis techniques that included specific heat determination as well as differential scanning calorimetry thermal scans. Specimens were evaluated at time periods that included immediately after fabrication, 24 hours, one week, one month, and at three months. Overall results found that the solubility method chosen for this investigation did not provide the necessary sensitivity for depth of cure analysis of resin-modified glass-ionomer restorative materials. Hardness and thermal analysis provided evidence of a continuing, post-photopolymerization reaction that resulted in increased hardness, specific heat, and thermal requirements over the storage times. Furthermore, the resin-modified glass-ionomer restorative materials demonstrated water storage behavior similar to conventional glass-ionomer materials, in that water gained by the materials became more bound as storage time increased. Individual instances were observed in which the physical properties of 3 mm thick specimens were similar to that observed of 2 mm specimens, however these findings were not consistent throughout the investigation. Based on the conditions of this study, it is recommended that resin-modified glass-ionomer restorative materials should not be cured in thicknesses greater than two millimeters.

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Marquette University

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this copy of the
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This thesis is the result of clinical questions that I have pondered over years of clinically using resin-modified glass-ionomer restorative materials. Unfortunately, as with all research, as this thesis comes to a conclusion many questions still remain.

Enduring, structured, and meaningful work cannot be accomplished by a single entity. I have many people to whom I am indebted for their support and encouragement. First and foremost, I wish to thank my best friend and life partner:

vocation and military life even at times when you do not understand some of my choices. Without your love and support, none of this would have been possible. [redacted]

give many thanks for understanding the times that dad was "busy" and had to do his "homework".

I wish to sincerely extend my appreciation to the dental manufacturers who graciously donated the restorative materials for this research. I hope that the investment that 3M/ESPE and GC America made will be worth their expense. If it were not for dental manufacturers such as these, dental research as we know today would not exist. I desire to also express my gratitude to the US Navy Institute for Dental and Biomedical Research and the US Air Force Dental Evaluation and Consultation Service for allowing me the additional office space and access to laboratory equipment.

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CHAPTER 1:

INTRODUCTION AND LITERATURE REVIEW

Glass-ionomer cements were invented and developed by Wilson and Kent in the early 1970's.[1] Glass ionomer cements generally consist of a mixture of various polyacrylic acids and tartaric acid that react with a fluoroaluminosilcate glass. The setting reaction occurs via an acid-base reaction between the acids and the calcium and aluminum ions that are leached from the glass component.[2,3] The early glass-ionomer cements have undergone incremental changes in formulations in attempts to improve their physical properties and clinical handling characteristics.[3] These modifications have included the use of alternative polyacids,[3] water-activated dehydrated polyacid powders,[3,4] cermets,[5] metal additions,[6,7] and smaller mean glass particle size.[8]

Resin-modified glass-ionomers (RMGI) are materials that consist substantially of glass-ionomer components (water-soluble polymeric acids, ion-leachable glass, and water) combined with organic, photopolymerizable monomers and an initiation system.[9] Although the exact composition of the RMGI materials is proprietary, the resin composition in the set material has been estimated to be approximately 4.5 to six percent.[10] These materials were developed to hopefully improve the mechanical properties and early moisture sensitivity observed with the conventional glass-ionomer materials.[11,12] The RMGI materials basically exist in two forms: One in which part of the water is replaced by water-soluble, photopolymerizable 2-hydroxyethylmethacrylate monomer (HEMA), and one in which methacrylate groups are predominately grafted onto the polyacrylic molecules.[13,14] Fuji II LC (GC America Corp, Alsip, IL) and Photac-Fil Quick (3M ESPE, St. Paul, MN) have been identified as members of the former, while Vitremer (3M ESPE) is considered to be a member of the latter.[13-15] Although HEMA is the predominate methacrylate used,[16-18] some formulations may use a combination of HEMA and diurethane dimethacrylate.[18]

Nicholson[3] described the setting reaction of RMGI materials as complex compared to conventional glass ionomer materials, especially in terms of the interactions of HEMA and other added constituents. Although a required constituent, HEMA lengthens both the working and

setting times of a glass ionomer material, as well as decreases the compressive strength.[19,20] HEMA also affects the configuration of the polyacrylic acid component and has been theorized to induce possible phase separations: polymerized HEMA components are water insoluble and may precipitate out of solution, establishing different domains within the material.[16] Paradoxically, some RMGI materials have been reported to not afford a long working time in the clinical environment, as the light-activated polymerization component of some products have been described as sensitive to ambient light exposure.[21] Some concern has been voiced regarding deeper regions of RMGI materials where light penetration may not be of sufficient concentration for photopolymerization.[3] Manufacturers have added additional chemically-activated (i.e., auto cure) methods in order to address clinical concerns.[21] There is some apprehension concerning the leaching of unreacted monomers, as such, RMGI materials may be the subject of future biocompatibility investigations.[22] Interestingly, a recent report details the formation of a HEMA-free RMGI material that may address future cytotoxicity concerns of HEMA in these materials.[23]

RMGI Setting Reaction

The setting reaction of RMGI materials has been studied as a function of delay or omission of visible light activation,[13] with the chemical setting process also investigated using infrared spectroscopy.[24-27] Li *et al.*[27] investigated the setting behavior of 2-mm thick samples of RMGI materials using Fourier transform infrared (FTIR) spectroscopy and diametral tensile strength (DTS). They reported that DTS improved with time, which reflected a continuing setting reaction. FTIR analysis reported only aliphatic C=C groups were present in the RMGI liquid and resin but could not determine if the HEMA groups were free in solution or grafted on the polyacrylic acid backbone chain. In comparing the effect of delaying visible light curing on the strength of RMGI, Li *et al.* reported in the absence of light activation Vitremer obtained a higher DTS compared to Photac Fil Aplicap.[27] Interestingly, delay of photoinitiation had no effect on Vitremer, whereas delay of light activation significantly lowered the DTS of Photac-Fil.[27]

Kakaboura *et al.*[28] also used FTIR spectroscopic analysis using one-millimeter-thick RMGI specimens, identifying the 1638 cm^{-1} methacrylate C=C stretch vs. the 1712 cm^{-1} ester C=O stretch as a means for assessing the resin reaction. For monitoring the acid/base reaction, the authors compared the 1740 cm^{-1} ester stretch to the 1600-1500 cm^{-1} peak of carboxylate salts formed. They reported that Fuji II LC, Photac-Fil, and Vitremer did exhibit an acid/base reaction after 20 minutes of dark storage and that the acid/base reaction was significantly slowed by the light activation process.[28] Of the three RMGI products investigated, Photac-Fil Aplicap (a previous formulation of Photac-Fil Quick) formed the lowest acid/base reaction products while no difference was found between Fuji II LC and Vitremer. The authors suggested that this finding was due to fact that Photac Fil Aplicap contained most of the polyacrylic acid in the powder component, and required more water infiltration for full reaction. After 20 minutes of dark storage, Fuji II LC and Photac-Fil Aplicap were found to have limited methacrylate curing efficiency, whereas Vitremer exhibited a self-curing methacrylate curing reaction that did not appear to interfere with the acid/base reaction. However, the authors could not speculate on the influence of immediate light activation on the retardation of the acid/base reaction.[28]

de Gee *et al.*[13] studied the effects of delay/omission of photopolymerization on the three-body wear characteristics of Fuji II LC, Photac-Fil, and Vitremer. These researchers reported that Photac-Fil Aplicap did not seem to contain an auto-polymerization catalyst for the HEMA component, and while delayed light activation favored the development of the acid-base component, total omission of light activation resulted in a relatively weak material that could leach unpolymerized HEMA.[13] In contrast, Fuji II LC was found to contain an auto-curing HEMA mechanism, but in omission of light activation the poly-HEMA chains polymerized at a rate that retarded the acid/base reaction which led the authors to speculate that the HEMA network approached full formation within a few minutes of mixing. Vitremer, in whose structure is formed by a chemical integration of the polyalkenoate and poly-HEMA network, was found to have better physical properties and the researchers observed that the HEMA auto-cure polymerization reaction did not appear to interfere with the simultaneous acid/base reaction.[13]

Ando *et al.*[29] reported on the effect of delay of light curing for up to 40 minutes of a RMGI orthodontic cement (Fuji Ortho LC, GC America). These researchers found that although a trend towards reduction of bond strength was observed, there was no significant difference between tensile bond strengths of the RMGI orthodontic cement observed between 0, 5, 20, and 40 minutes delay of light exposure.[29]

Wan *et al.*[24] investigated Fuji II LC using FTIR spectroscopy and reported that although the photopolymerized reaction is responsible for the initial set, the detected acid-base reaction continued at a rate that leveled at 168 hours after mixing. They confirmed earlier reports[3] that HEMA retards the acid-base reaction by inducing stereochemical changes to the polyacrylic polymer, while the set HEMA resin matrix established physical barriers that slowed the process of diffusion.[24] Watson *et al.*[30] evaluated the RMGI/dentin interface during the initial setting reaction using laser-scanning confocal microscopy and reported that water movement from the dentinal tubules into the RMGI material was observed during light polymerization and further theorized that this water movement was essential for the formation of the "absorption layer" observed with RMGI materials.[30] Young[31] noted the difficulty of using FTIR spectroscopy for distinguishing RMGI setting changes due to photopolymerization and those arising from the acid-base reaction. Young observed peak loss at 1322 and 1300 cm^{-1} bands due to water (1640 cm^{-1} stretch band) masking the 1633 cm^{-1} C=C stretch band and reported that 90 percent of the monomer was polymerized after 20 seconds of light exposure.[31] However, the acid-base reaction of unpolymerized sections were reported to proceed slower compared to conventional glass ionomer products.[31] Young *et al.*[32] studied the acid/base reaction of glass ionomer cements using Raman spectroscopy and confirmed the necessity of water availability for the acid/base initial reaction to proceed.

Palmer *et al.*[33] evaluated the HEMA released as a function of curing method for two RMGI liner and two RMGI restorative materials. Both of the restorative materials polymerized by five minutes when auto-cured in the absence of light activation, but both materials released

significantly more HEMA compared to the same products that were photopolymerized. These researchers also reported that HEMA release from both RMGI materials was similar after photopolymerization, but Vitremer restorative material released significantly less HEMA than Fuji II LC, suggesting that the Fuji II LC auto-cure mechanism is less efficient compared to Vitremer restorative.[33] Interestingly, Palmer *et al.* corroborated earlier research by Kanchanavasita *et al.*[34] that Fuji II LC would benefit from a visible light photopolymerization time longer than that recommended by the manufacturer.[33]

RMGI Adhesion Studies

Resin-modified glass-ionomer products have been demonstrated to adhere to both enamel and dentin.[35-46] The adhesion mechanism was first described by Wilson *et al.*[48] through the development of ionic crosslinks at the restorative-tooth interface via the then-described "ion exchange layer." In the ion-exchange layer, Wilson *et al.*[48] postulated the formation of an ionic bond between the polyacrylic acid and the hydroxyapatite component of the mineralized tissue. This mechanism was later confirmed by Yoshida *et al.*[49] using X-ray Photoelectron Spectroscopy while the same investigators further detailed the interaction between the polyalkenoic acids and hydroxyapatite in a later report.[50] The bonding of RMGI to dentin was later found to be two-fold, being both the ionic bond between tooth hydroxyapatite and polyacrylic acids as confirmed by Yoshida *et al.*[49,50] but also by a micromechanical means by the formation of a hybrid layer, analogous to, but of smaller thickness of that seen with dentin bonding agent systems.[51-53]

Sidhu and Watson[54] studied the RMGI tooth/restoration interfacial characteristics using confocal fluorescence microscopy and theorized that the seemingly structure-less, identified "absorption layer" was possibly due to water movement within the RMGI material, either by water diffusion within the setting restoration material or from the dentin and pulp of a vital tooth. The absorption layer was also observed to form over time after initial setting of the RMGI matrix and was found only in deep dentin, not being present when the RMGI material was bonded to

enamel or superficial dentin.[54] Sidhu *et al.*[55] investigated the shear bond strength of RMGI materials and reported that the absorption layer appeared to have an important role in mediating the bond between RMGI and dentin. Tay *et al.*[56] further researched the absorption layer and confirmed that it was formed only in the presence of available moisture and was a necessary feature for the development of bond strength of the RMGI to dentin. Furthermore, silver-nitrate staining techniques identified capillary pore spaces that were theorized to provide the continuous water, arising from the hydrated dentin, required for full development of the absorption layer.[56]

Yiu *et al.*[57] investigated the interaction of RMGI materials with moist dentin using transmission electron microscopy (TEM) and scanning electron microscopy (SEM) ultrastructural methods and reported unique spherical bodies within the RMGI matrix only in areas that were close to the RMGI-dentin interface. Further analysis of these spherical bodies allowed the authors to theorize that the spherical body core was composed of a poly-HEMA matrix derived from water transmission from the moist dentin, while the periphery contained products from the slower ongoing acid-base reaction.[57] Pereira *et al.*[47] investigated RMGI restorative material bond strength to dentin as a function of dentin regional differences and simulated pulpal pressure, and reported that pulpal pressure had a strong influence on bond strength. These researchers also observed that although water is essential to the RMGI setting reaction, excess water may be detrimental to the early setting reaction.[47]

RMGI Depth of Cure Studies

The depth of cure of RMGI materials has been reported in some studies and reviews, with various methodology and materials reported. Burke *et al.*[58] investigated the depth of cure of early RMGI lining agents using a scrape methodology and reported that the liners displayed greater hardness at increased depths when measured 12 hours after photopolymerization, suggesting that the RMGI products possessed an auto-cure acid/base reaction in addition to photopolymerization. Swift *et al.*[59] investigated the depth of cure of Fuji II LC, Photac-Fil

Aplicap, and Vitremer compared to two compomers. They photopolymerized rectangular 5 mm x 5 mm molds that were 9 mm in depth and measured the Knoop Hardness at time intervals of 10 minutes, 24 hours, and seven days after photopolymerization. For all materials tested, only the top five millimeters of the specimens had enough consistent hardness for measurement. At the end of seven days, there was no statistical difference in hardness between specimen top surfaces and five-millimeter levels. However, due to lower hardness values at increased depths, the authors recommended that it would be prudent to place and cure RMGI materials in two to three millimeter increments.[59] One literature review[21] reported depth of cure values of RMGI lining and restorative materials that ranged from 1.54 to 2.26 mm for lining materials and 2.68 to 2.97 for restorative materials. However, this review only referenced the methodology used for depth of cure determinations and does not identify the source of the data.[21] Accordingly, it cannot be ascertained if this reported data has been subject to scientific peer review.

The depth of cure of RMGI materials has not received the attention that has been directed to the resin composite restorations. The main cause for this lack of interest may be due to the fact that most clinicians oversimplify RMGI materials compared to conventional glass–ionomer materials and reason that the depth of cure is not as significant, assuming that the acid/base component reaction will compensate for inadequate penetration of light.[3] Research has established that the RMGI material setting reaction is indeed complex and earlier investigations regarding RMGI depth of cure may have been too simplistic in nature. For instance, early laboratory studies were not comprehensive in scope as per physical properties and no investigations to date have included *in vitro* models that investigates the *in vivo* pulpal pressure hydration effect on the physical properties of the deeper RMGI regions. Accordingly, it can be conjectured that water influx from pulpal pressure may have a dilution effect on these deeper regions that have not experienced photopolymerization, with a possible negative effect on material physical and mechanical properties.

Purpose

The purpose of this investigation was to characterize the depth of cure of resin-modified glass-ionomer restorative materials using physical property testing to include hardness, solubility, as well as thermal analysis using differential scanning calorimetry. The research hypothesis is that RMGI materials will display a depth of cure gradient that is more dependent on visible light penetration rather than what residual acid-base chemical setting reaction that may remain.

CHAPTER TWO:

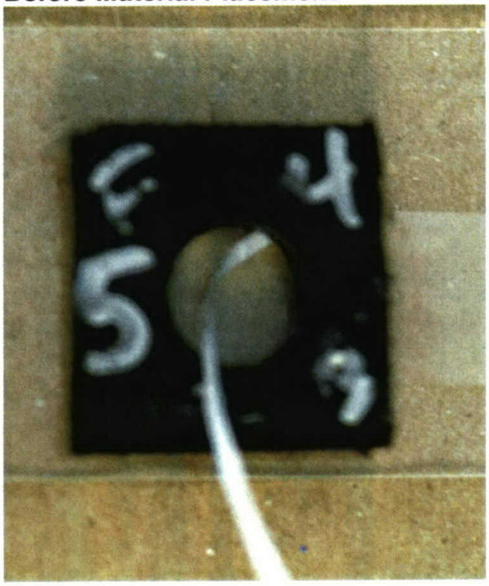
METHODS AND MATERIALS

The RMGI materials consisted of Fuji II LC (GC America), Vitremer (3M/ESPE), and Photac Fil Quick (3M/ESPE). All materials were prepared and mixed per manufacturers instructions in a dental materials lab fitted with special lighting that excluded the light spectrum to which photoinitiators are sensitive (F40/GO Gold, Sylvania, Danvers, MA 01923), except for specimens prepared for thermal analysis which was accomplished in a different laboratory. For precapsulated materials, mechanical mixing was accomplished with a microprocessor-controlled calibrated and programmed mixing unit (Automix, Sybron Dental Specialties, Orange CA). Materials that were not precapsulated were manually prepared per manufacturer directions, placed in a syringe delivery system (AccuDose Low Viscosity, Centrix Inc., Shelton CT), and injected into respective molds. Visible light polymerization was accomplished using a halogen-based, visible-light polymerization unit (Optilux 501, Sybron Dental Specialties, Orange CA) whose performance was assessed using a laboratory laser power meter (PowerMax 5200 with PM10 Probe, Molectron, Portland OR) before each use. When not in use, specimens were stored in dark conditions at 98 ± 2 percent humidity at 37 ± 2 °C.

For the purpose of this master's thesis, physical property and thermal analysis methods were observed, depending on the method, at intervals of immediately after fabrication, 24 hours, one week, one month, and at three months. Continued observations will continue after completion of the thesis at six, nine, and twelve months after preparation for the purpose of information gathering for submission of manuscripts.

Solubility: Solubility testing was based on ANSI/ADA Specification No. 27: Resin-Based Filling Materials (1997),[60] using Delrin molds with a diameter of 8.0 mm and depths of 2, 3, 4, and 5 mm. Ten specimens (five molds experimental and five molds control) were prepared for each material and time period evaluated. Specimens of each respective depth were placed on a mylar-covered glass slide and placed on a dental vibrator. Immediately prior to placing the material, a pre-weighed, 50 mm long piece of unwaxed dental floss was positioned so that approximately 4 mm extended into the bottom of each empty mold (Figure 1).

Figure 1. Solubility Specimen Mold Before Material Placement



Specimens were filled the entire depth of the mold (Figure 2) and the top surface was then covered with a mylar strip and a glass slide with pressure placed in order to produce a flat surface (Figure 3). The experimental specimens were photopolymerized for the manufacturer recommended curing time from the top of the mold (Figure 4) and then stored (Figure 5). Control specimens were photopolymerized from both top and bottom of the molds for the manufacturer recommended curing time.

Figure 2. Material Placement

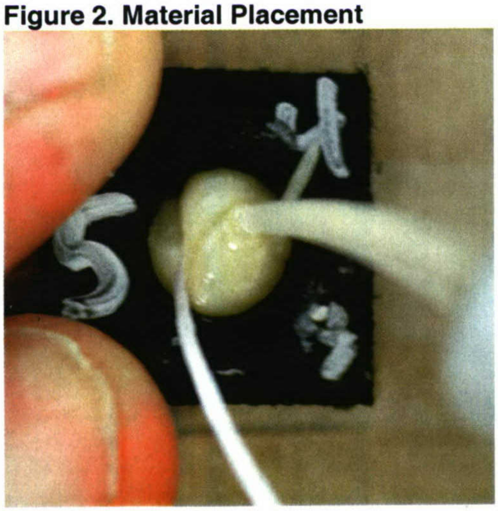


Figure 3. Specimen Prior to Photopolymerization

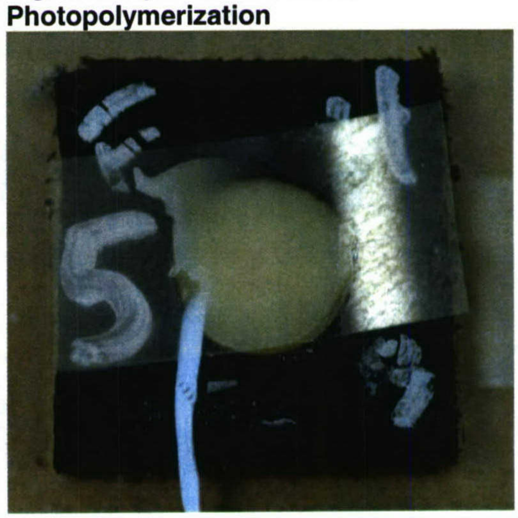


Figure 4. Specimen Photopolymerization

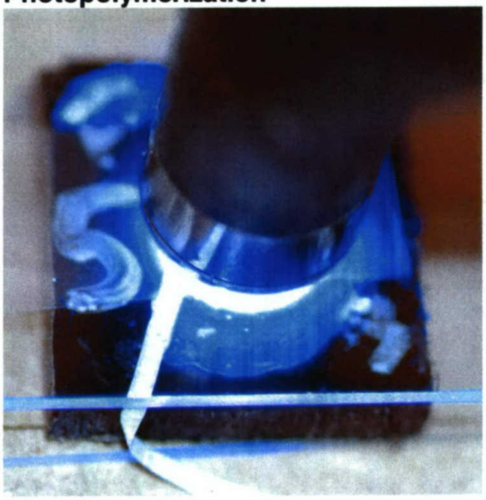
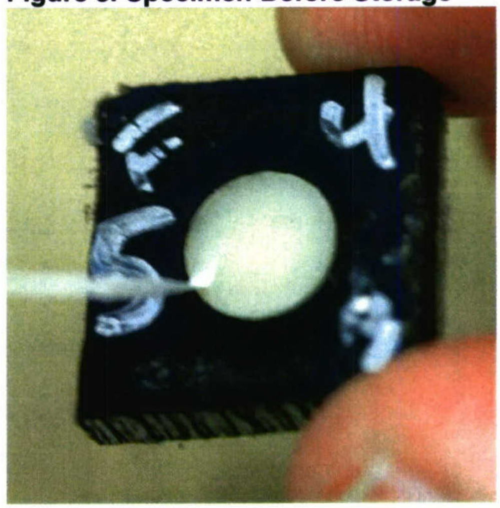


Figure 5. Specimen Before Storage



At the appointed time of evaluation, each specimen was removed from its respective mold and was weighed to the nearest 0.001 g, the weight of the floss subtracted, and this value designated as Wt1. Each specimen was placed into a bottle containing 100 mL of distilled water in a manner in which they were suspended from contact with the bottle and completely immersed in the water. The bottle was then sealed and stored for 24 hours at 37 ± 2 °C, after which the specimens were removed from the water, rinsed with distilled water, and blot dried with absorbent paper, and then weighed. The specimens were then stored in a desiccator for 24 hours at a relative humidity of 10 ± 5 percent and then weighed to the nearest 0.001 g. The specimens were weighed daily until a constant weight was reached (± 0.001 g). The weight of the floss was subtracted from this value with the result designated as the final weight (Wt2). The solubility (S), expressed as a percentage of weight, was calculated using the formula:

$$S = \frac{Wt1 - Wt2 \ \ X \ 100}{Wt1}$$

Mean solubility was compared with analysis of variance (ANOVA) followed by Scheffé's post-hoc pairwise comparison test to determine if significant differences existed as per curing method and depth of cure at the 0.05 level of significance.

Hardness: Delrin molds were used with a diameter of 5.0 mm and depths of 2, 3, 4, and 5 mm. Five molds of each depth were prepared for each time period evaluated. Specimens of each respective depth were placed on a mylar-covered glass slide and filled the entire depth of the cylinder. The top surface was then covered with a mylar strip and a glass slide with pressure placed in order to produce a flat surface. The specimens were photopolymerized from the top orientation for the time recommended by the manufacturer and then stored in dark conditions as previously specified.

At the appointed time of evaluation Knoop Hardness numbers (KHN) were determined with a hardness tester (M-400-G2, LECO, St Joseph, MI) using a 100 g load and a dwell time of 10 s. Three replicate Knoop Hardness (KH) measurements were made at the center of the top and bottom surfaces at the appointed time period for evaluation. The three values from each specimen surface were averaged to yield a top and bottom summary value for each specimen. The summary values for each of the specimen surfaces were then averaged to yield a mean and standard deviation. Values were compared with ANOVA followed by Scheffé's post-hoc pairwise comparison test to determine if significant differences existed among the depths of cure at the 0.05 level of significance.

Differential Scanning Calorimetry: RMGI materials were prepared as per manufacturer's recommendations and placed either in 40 μl differential scanning calorimetry (DSC) aluminum crucibles (Mettler Toledo GmbH, Schwerzenbach CH) for the 2 mm depth sample, or 100 μl aluminum DSC crucibles for the 3 and 4 mm depth samples. Five mm depth samples were not prepared for the DSC evaluation due to the lack of a suitable crucible. Each respective material was polymerized with a visible light-curing unit for the manufacturer recommended time, weighed on an analytical balance (AG245, Mettler Toledo GmbH), and then stored in dark

conditions as previously specified. An unfilled reference aluminum DSC crucible of both 40- and 100 μl was also stored with each sample group. At the appointed time of evaluation, specimens were weighed, placed into a DSC unit (DSC822[e], Mettler Toledo GmbH), and were first subjected to a specific heat capacity determination thermal scan from 20 °C to 60 °C at a rate of 10 °C per minute as per the protocol of Khalil and Atkins.[61] Each scan was preceded and followed by a five-minute isothermal 20 °C period. Each specimen was subjected to three heat capacity determination scans with the weight of the specimen registered between each scan. The heat capacity of each scan was determined as the mean of the specific heat values calculated by the DSC software (Star[e], Version 8.10, Mettler Toledo GmbH) over the temperature range. The average of the three specific heat determination scans was recorded as the mean with standard deviation for each sample, as well as the weight loss using the analytical balance. After the three specific heat capacity determination scans, the specimen was then subjected to a thermal scan of 37 °C to 240 °C[61] with the thermal flow characteristics of the material analyzed with thermal analysis software (Star[e], Version 8.10, Mettler Toledo GmbH). Mean specific heat capacity, thermal scan findings, and weight loss was determined for each material thickness and compared with ANOVA and Scheffe' *post hoc* multiple comparison tests.

CHAPTER THREE:

RESULTS

Solubility

The complete solubility data can be found in Tables 64-93 in Appendix A.

Table 1. Vitremer Mean Solubility Results (%)

Time/Thickness	EXPERIMENTAL Mean	EXPERIMENTAL SD	CONTROL Mean	CONTROL SD	t-test p =
IMMEDIATE					
2 mm	4.19	0.28	3.91	0.35	0.193
3 mm	4.70	0.47	4.27	0.40	0.160
4 mm	7.60	1.89	5.05	0.17	0.017
5 mm	5.46	0.24	4.76	0.28	0.003
24 Hour					
2 mm	5.58	0.53	5.69	0.28	0.682
3 mm	5.45	0.36	5.65	0.50	0.511
4 mm	5.79	0.34	5.04	0.46	0.020
5 mm	4.83	0.29	4.85	0.29	0.891
ONE WEEK					
2 mm	5.41	0.44	6.06	0.41	0.041
3 mm	5.47	0.61	5.52	0.41	0.874
4 mm	5.20	0.41	5.60	0.39	0.167
5 mm	5.61	0.47	6.01	0.73	0.337
ONE MONTH					
2 mm	7.05	0.78	6.52	0.31	0.195
3 mm	7.79	0.65	7.49	0.79	0.540
4 mm	6.32	0.33	7.23	0.89	0.060
5 mm	7.84	0.68	8.69	0.68	0.086
THREE MONTH					
2 mm	4.93	0.55	4.51	0.15	0.140
3 mm	5.29	0.48	5.43	0.50	0.668
4 mm	5.97	0.36	5.17	0.75	0.062
5 mm	5.75	0.52	5.90	0.84	0.743

$n = 5$
p values presented in red are statistically significant $p < 0.05$

Mean solubility results for the Vitremer samples can be seen in Table 1. Multivariate ANOVA analysis of the Vitremer solubility results as a function of specimen cure method, thickness, and storage time identified significant differences ($p < 0.0001$) in solubility for all factors, with an interaction noted between the factors storage time and thickness ($p < 0.0001$) for both curing methods.

Within the experimental group, solubility at the one-month storage time was significantly greater ($p < 0.0001$) than all of the other storage times. Considering experimental group thickness, the 4 mm samples demonstrated a trend with the most solubility, exhibiting significantly more solubility than the 2 mm samples ($p = 0.001$) but did not exhibit significant difference than the 3 mm or 5 mm samples.

The Vitremer control group similarly exhibited significantly more solubility at the one-month storage time ($p < 0.0001$) but there were differences noted between the other thicknesses as well. The immediate Vitremer control samples demonstrated significantly less ($p \leq 0.001$) solubility than the other storage times, while there were no significant differences identified between the 24-hour and one week and the one-week and one-month storage times. *Post* hoc analysis of the Vitremer control samples as a function of thickness showed that the 5 mm samples exhibited significantly more solubility ($p < 0.0001$) than the 2 mm samples, with no difference in solubility noted between the 2 mm, 3 mm, and 4 mm samples ($p = 0.190$) and the 3 mm, 4 mm, and 5 mm samples ($p = 0.051$).

Independent t-test analysis comparing the Vitremer experimental and control samples at equal sample thickness and storage times revealed, except for four instances, that there was no overall difference in solubility between the two curing methods. The immediate 4 mm and 5 mm as well as the 24-hour 4 mm control samples were found to exhibit significantly less solubility than the experimental samples for the same thickness and storage time. Paradoxically, the one-week 2 mm control samples were found to exhibit significantly more solubility than the experimental samples of the same thickness and storage time.

Table 2. Fuji II LC Mean Solubility Results (%)					
Time/Thickness	EXPERIMENTAL		CONTROL		t-test
	Mean	SD	Mean	SD	p =
IMMEDIATE					
2 mm	3.89	0.31	2.61	1.03	0.029
3 mm	3.82	1.80	1.80	0.46	<0.0001
4 mm	4.77	1.87	2.15	0.12	0.014
5 mm	4.79	0.20	2.13	0.09	<0.0001
24 HOURS					
2 mm	3.85	0.18	3.29	0.09	<0.0001
3 mm	3.24	0.11	3.18	0.06	0.288
4 mm	3.22	0.16	3.03	0.07	0.039
5 mm	3.20	0.10	2.91	0.06	0.001
ONE WEEK					
2 mm	4.90	1.65	5.12	0.20	0.767
3 mm	4.64	0.12	4.59	0.10	0.473
4 mm	4.79	0.20	4.69	0.22	0.485
5 mm	4.74	0.68	4.58	0.12	0.619
ONE MONTH					
2 mm	5.11	0.24	4.89	0.24	0.181
3 mm	5.17	0.13	5.01	0.11	0.076
4 mm	5.32	0.41	4.96	0.16	0.108
5 mm	5.25	0.22	4.80	0.15	0.005
THREE MONTHS					
2 mm	4.72	0.58	4.04	0.13	0.034
3 mm	5.56	0.86	4.11	0.37	0.008
4 mm	4.72	0.29	4.14	0.33	0.018
5 mm	4.39	0.17	3.84	0.20	0.002

n = 5
p values presented in red are statistically significant $p < 0.05$

The results for the Fuji II LC solubility samples can be seen in Table 2. Multivariate ANOVA analysis of the results as a function of specimen cure method identified significant differences ($p < 0.0001$) in solubility both within and between the two groups. In addition, there were differences noted between the two curing method groups when analyzed within the groups with two-way ANOVA as a function of time and thickness.

For the Fuji II LC experimental solubility group there was an identified interaction between the two factors of storage time and thickness ($p = 0.044$) while Scheffe *post hoc* analysis did not identify a significant difference in solubility when considering thickness ($p = 0.960$) for the experimental group. A significant difference ($p < 0.0001$) was identified within the experimental group for the factor storage time, with the one-month samples indicated with significantly more solubility ($p < 0.002$) than the immediate and 24-hour samples. However, the one-month samples exhibited statistically similar solubility with the one-week and three-month samples ($p = 0.334$).

The Fuji II LC control solubility group was identified as having significant differences within the group for both sample thickness and storage time ($p < 0.001$) with no interaction between the factors of thickness and storage time ($p = 0.079$). The Fuji II LC 2 mm samples were found to exhibit significantly more solubility than 3 mm and 5 mm ($p < 0.039$) but were statistically similar to the 4 mm samples ($p = 0.157$). *Post hoc* analysis for the Fuji II LC control samples as a function of storage time indicated that the one-month samples exhibited significantly more solubility ($p < 0.0001$) than the other storage times except for the one-week samples ($p = 0.556$).

Independent t-test analysis comparing the Fuji II LC experimental and control samples at equal sample thickness and storage times revealed that over half of the control samples exhibited significantly less solubility than the experimental samples. This was most frequently noted with the immediate, 24-hour, and three-month groups. There were no significant differences in solubility noted between paired samples within the one-week group, and the majority of the one-month group.

The results of the Photac-Fil Quick solubility can be seen in Table 3. Multivariate ANOVA analysis of the results as a function of specimen cure method identified significant differences ($p < 0.0001$) in solubility both within and between the two groups. Additionally, there were differences noted between the two groups when analyzed within each group using two-way ANOVA analysis as a function of time and thickness.

Similar to the Fuji II LC samples, the Photac-Fil Quick experimental solubility group exhibited an interaction between the two factors of specimen thickness and storage time ($p < 0.0001$) but a significant difference was not found in solubility between the different sample thicknesses ($p = 0.690$). A significant difference in solubility was noted when analyzed per storage time ($p < 0.0001$) with the one-month experimental samples demonstrating significantly more solubility

Table 3. Photac-Fil Quick Mean Solubility Results (%)

Time/Thickness	EXPERIMENTAL Mean	EXPERIMENTAL SD	CONTROL Mean	CONTROL SD	t-test p =
IMMEDIATE					
2 mm	3.89	1.10	4.00	0.51	0.842
3 mm	4.96	1.38	3.60	0.33	0.0642
4 mm	5.52	0.83	3.65	0.16	0.001
5 mm	5.64	0.70	3.29	0.17	<0.0001
24 Hour					
2 mm	7.96	0.43	6.01	0.33	<0.0001
3 mm	6.58	0.72	5.45	0.55	0.024
4 mm	6.00	0.46	5.28	0.19	0.012
5 mm	5.75	0.37	5.25	0.85	0.257
ONE WEEK					
2 mm	6.07	1.07	5.89	0.44	0.719
3 mm	6.80	0.20	5.53	0.58	0.002
4 mm	6.15	0.35	5.91	0.37	0.328
5 mm	6.31	0.20	5.71	0.41	0.019
ONE MONTH					
2 mm	7.17	0.50	6.24	0.41	0.013
3 mm	6.30	0.34	5.69	0.14	0.006
4 mm	6.78	0.22	5.62	0.14	<0.0001
5 mm	6.31	0.52	5.46	0.13	<0.0001
THREE MONTH					
2 mm	5.44	0.27	5.26	0.25	0.332
3 mm	5.21	0.28	4.86	0.37	0.129
4 mm	5.56	0.41	5.12	0.21	0.066
5 mm	5.46	0.13	5.09	0.46	0.204

n = 5
p values presented in red are statistically significant $p < 0.05$

than the immediate and three-month samples ($p < 0.0001$) but statistically similar to the 24-hour and one-week samples ($p = 0.660$). The Photac-Fil Quick control solubility group was identified as having significant differences within the group for both sample thickness and storage time ($p < 0.001$) but without an identified interaction between the factors of thickness and storage time ($p = 0.523$). The Photac-Fil Quick 2 mm control samples were found to curiously exhibit significantly more solubility than the other thicknesses ($p < 0.018$) with no significant difference noted between the other thicknesses ($p = 0.590$). *Post hoc* analysis of the Photac-Fil Quick control samples as a function of storage time indicated that the 24-hour, one-week, and one-month samples were statistically similar ($p = 0.359$) and exhibited significantly more solubility than the immediate samples ($p < 0.0001$) and the three-month samples ($p = 0.034$).

Independent t-test analysis of the Photac-Fil Quick experimental and control samples at equal sample thickness and storage times revealed that over half of the control samples exhibited significantly less solubility than the experimental samples. This was most frequently noted with the 24-hour and one-month groups. There were no significant differences in solubility noted between paired samples between the samples at three months, with mixed results with the immediate and one-week groups.

Hardness

The complete data concerning hardness testing may be observed in Tables 94 – 105 in Appendix B.

The mean KHN value results for Vitremer can be observed in Table 4. The data was analyzed for possible differences in hardness of different layers as a function of thickness and if any possible changes over the stated storage periods. In the comparison of top surface hardness, ANOVA did not identify a significant difference (p = 0.47) in the top surface hardness values at the 24-hour storage time, but identified differences at one week (p = .0054), one-month (p = 0.0064), and three months (p = 0.01) At the one-month storage time, the only significant differences were noted between the 3 mm and 5 mm top surfaces (p = 0.045), while for the three-month aged specimens Scheffe multiple comparison test identified a difference only between the 2 mm and 4 mm top surfaces (p = 0.0107).

Table 4. Vitremer Mean Hardness Results (KHN)

	24 Hours	1 Week	1 Month	3 Months
2mm Top	24.5	22.4	27.1	27.1
sd	0.4	0.3	0.4	0.5
2mm Bottom	23.1	19.9	24.4	24.9
sd	0.3	0.2	0.4	0.6
3mm Top	24.9	22.4	26.7	23.3
sd	0.3	0.3	0.3	0.5
3mm Bottom	22.7	18.0	23.9	20.0
sd	0.4	0.1	0.6	0.5
4mm Top	23.9	22.1	27.7	21.7
sd	0.4	0.2	0.4	0.4
4mm Bottom	20.5	17.3	21.4	16.6
sd	0.7	0.2	0.2	0.2
5mm Top	24.1	22.8	27.8	24.5
sd	0.6	0.2	0.5	0.4
5mm Bottom	17.1	15.4	18.5	16.8
sd	0.6	0.2	0.2	0.5

n = 5

For the Vitremer top surface hardness compared over the three-month storage times, ANOVA identified a significant difference ($p < 0.0001$) within the 2 mm samples ($p < 0.0001$), the 3 mm samples ($p = 0.0002$), the 4 mm samples ($p = 0.0004$), and the 5 mm samples ($p < 0.0001$). The results of the *post hoc* multi comparison tests can be seen in Table 5.

Table 5. Scheffe Multi Comparisons For Vitremer Top Surface Hardness Over Storage Time

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	**0.0098**	**0.0179**	0.3286	**0.0469**
24-Hour vs. l Month	0.2829	0.2569	0.067	**< 0.0001**
24-Hour vs. 3 Months	0.1663	0.5458	0.2663	0.8408
1 Week vs. 1 Month	**0.0002**	**0.0003**	**0.0018**	**< 0.0001**
1 Week vs. 3 Months	**0.0001**	0.2288	0..9989	**0.0086**
1 Month vs. 3 Months	0.9873	**0.0208**	**0.0014**	**< 0.0001**

n = 5
Results shaded red are considered significant at a 95% confidence interval

Concerning the analysis of the Vitremer bottom KHN over the storage times, one-way ANOVA identified a significant difference within the 2 mm ($p < 0.0001$), 3 mm ($p < 0.0001$), 4 mm ($p < 0.0001$) and 5 mm ($p = 0.033$) sample groups. The results of the *post hoc* multi comparison tests can be seen in Table 6.

Table 6. Scheffe Multi Comparisons For Vitremer Bottom Surface Hardness Over Storage Time

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	**< 0.0001**	**< 0.0001**	**0.016**	0.258
24-Hour vs. I Month	0.867	0.425	0.834	0.745
24-Hour vs. 3 Months	0.108	0.068	**0.024**	0.834
1 Week vs. 1 Month	**< 0.0001**	**< 0.0001**	**0.003**	**0.042**
1 Week vs. 3 Months	**< 0.0001**	**0.007**	0.997	0..713
1 Month vs. 3 Months	0.375	**0.003**	**0.004**	0.282

n = 5
Results shaded red are considered significant at a 95% confidence interval

The mean bottom/top KHN ratios of the Vitremer samples by thickness and time can be seen in Table 7. For each thickness analyzed over the storage time, ANOVA did not identify a difference within the 2 mm, 4 mm, or 5 mm groups over the storage time. However, a difference ($p < 0.0001$) was identified within the 3 mm samples with the one week samples identified as having a significantly lower mean bottom/top ratio than the other storage time periods ($p < 0.0001$).

Table 7. Vitremer Mean Bottom/Top KHN Ratios (%)

	24 Hours	1 Week	1 Month	3 Months
2mm	93.0	88.7	89.8	93.4
sd	1.1	1.3	1.1	6.5
3mm	90.5	79.8	89.6	86.4
sd	1.7	1.4	2.4	3.5
4mm	84.7	77.7	77.2	80.1
sd	5.9	1.8	1.8	9.8
5mm	71.5	67.6	66.3	67.0
sd	9.9	1.2	1.3	5.6

n = 5

When the bottom/top ratio of the entire Vitremer group was compared with two-way ANOVA, a significant difference ($p < 0.0001$) was identified within the group with no interaction found between time and thickness ($p = 0.258$). Scheffe *post hoc* analysis identified that all thicknesses exhibited a significantly different mean bottom/top KHN ratio ($p < 0.0001$) from each other. When the KHN bottom/top ratio was analyzed as a function of time, Scheffe identified a significant difference between the 24-hour groups and one-week ($p = 0.001$) with no significant difference noted between any of the other storage times.

Table 8. Fuji II LC Mean Hardness Results (KHN)

	24 Hours	1 Week	1 Month	3 Months
2mm Top	20.8	20.7	20.0	20.6
sd	0.3	0.3	0.5	1.0
2mm Bottom	18.4	18.8	18.2	18.6
sd	0.3	0.5	0.3	0.5
3mm Top	20.4	20.6	20.1	20.6
sd	0.3	0.3	0.6	0.1
3mm Bottom	15.2	18.2	16.7	19.4
sd	0.2	0.3	0.2	0.1
4mm Top	20.2	21.3	19.6	21.3
sd	0.1	0.4	0.4	0.3
4mm Bottom	11.6	15.4	11.8	13.1
sd	0.3	0.6	0.5	0.5
5mm Top	20.2	21.3	20.1	21.0
sd	0.3	0.2	0.4	0.2
5mm Bottom	9.7	12.8	10.9	10.6
sd	0.4	0.5	0.4	0.4

n = 5

The results of the Fuji II LC hardness testing can be seen in Table 8. For the Fuji II LC samples, ANOVA did not identify a significant difference for the top surfaces at the 24-hour storage ($p = 0.05$), one-week ($p = 0.47$), one-month ($p = 0.51$), or the three-month ($p = 0.24$) storage times.

Analysis of the Fuji II LC top surfaces over the storage times did not identify a significant change in the top surface hardness with the 2 mm samples (p = 0.1320), 3 mm samples (p = 0.3659), nor the 5 mm samples (p = 0.0671). ANOVA identified a significant change within the 4 mm samples (p = 0.001) with Scheffe finding a difference between the one-week and one-month samples (p = 0.0009) and the one-month and three-month samples (p = 0.0004). For the Fuji II LC bottom surfaces over the different storage times, ANOVA did not identify a difference within the 2 mm samples (p = 0.372), but identified differences with bottom surface hardness with the 3 mm (p < 0.0001), 4 mm (p < 0.0001), and 5 mm (p < 0.0001) samples. The results of the *post hoc* analysis can be seen in Table 9.

Table 9. Scheffe Multi Comparisons For Fuji II LC Bottom Surface Hardness Over Storage Time

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	0.793	**< 0.0001**	**0.001**	**< 0.0001**
24-Hour vs. I Month	0.919	**0.001**	0.629	0.254
24-Hour vs. 3 Months	0.948	**< 0.0001**	0.109	0.136
1 Week vs. 1 Month	0.425	**0.001**	**0.010**	**0.002**
1 Week vs. 3 Months	0.981	**0.025**	0.109	**0.004**
1 Month vs. 3 Months	0.648	**< 0.0001**	0.629	0.981

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 10. Fuji II LC Mean Bottom/Top KHN Ratio (%)

	24 Hours	1 Week	1 Month	3 Months
2mm	88.4	92.7	91.1	91.3
sd	1.9	9.3	2.7	4.2
3mm	74.7	88.5	82.8	94.0
sd	1.4	2.3	3.8	1.8
4mm	55.8	72.1	62.5	62.2
sd	6.1	2.0	5.8	6.2
5mm	47.6	60.1	52.9	51.4
sd	1.5	3.9	5.7	3.8

n =5

The Fuji II LC bottom/top KHN ratio results can be observed in Table 10. When analyzed per thickness as a function of storage time, ANOVA did not identify a significant different in change of the KHN ratio for the 2 mm samples (p = 0.641). ANOVA did identify significant changes in the 3 mm (p < 0.0001), 4 mm (p = 0.002), and 5 mm (p = 0.001) groups. The results of the *post hoc* multi comparison test can be seen in Table 11.

Table 11. Scheffe Multi Comparisons For Fuji II LC Bottom/Top Surface KHN Ratio Over Storage Time				
	Thickness			
Comparisons	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	0.658	< 0.0001	0.002	0.002
24-Hour vs. I Month	0.885	0.001	0.298	0.274
24-Hour vs. 3 Months	0.857	< 0.0001	0.348	0.541
1 Week vs. 1 Month	0.972	0.019	0.082	0.077
1 Week vs. 3 Months	0.982	0.027	0.067	0.028
1 Month vs. 3 Months	0.99	< 0.0001	0.99	0.954

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 12. Photac-Fil Quick Hardness Results (KHN)

	24 Hours	1 Week	1 Month	3 Months
2mm Top	11.5	13.7	17.5	17.0
sd	0.4	0.3	0.5	0.5
2mm Bottom	9.4	12.0	16.3	15.4
sd	0.2	0.2	0.1	0.4
3mm Top	11.6	13.6	18.1	16.8
sd	0.4	0.2	0.6	0.2
3mm Bottom	9.2	11.3	15.6	13.5
sd	0.1	0.3	0.2	0.5
4mm Top	12.0	12.8	18.2	16.9
sd	0.2	0.3	0.2	0.1
4mm Bottom	8.4	10.5	14.5	11.2
sd	0.5	0.2	0.4	0.1
5mm Top	11.6	12.7	17.9	17.3
sd	0.3	0.2	0.6	0.4
5mm Bottom	8.7	10.2	11.2	10.7
sd	0.4	0.1	0.2	0.2

n = 5

The results of the Photac-Fil Quick Knoop hardness testing can be seen in Table 12. For the analysis of the top surface KHN of the Photac-Fil Quick samples over the different storage times, no difference was noted between the top surface hardness at the 24-hour storage ($p = 0.73$), one-month ($p = 0.50$), nor three-month ($p = 0.05$) storage times. However, a significant difference in top surface hardness was noted ($p = 0.008$) within the one-week group, with a significant difference found between the 2 mm and 5 mm top surfaces ($p = 0.0213$). Regarding the changes of top surface hardness as a function of time, ANOVA identified significant differences for all of the thicknesses: 2 mm (p <

0.0001), 3 mm (p = 0.0014), 4 mm (p = 0.0004), and 5 mm (p < 0.0001). Results of the Scheffe *post hoc* tests can be seen in Table 13.

Table 13. Scheffe Multi Comparisons For Photac-Fil Quick Top Surface Hardness Over Storage Time

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	**< 0.0001**	0.5369	0.3286	**0.0469**
24-Hour vs. I Month	**< 0.0001**	**0.0317**	0.067	**< 0.0001**
24-Hour vs. 3 Months	**< 0.0001**	0..9894	0.2663	0.8408
1 Week vs. 1 Month	**< 0.0001**	**0.0019**	**0.0018**	**< 0.0001**
1 Week vs. 3 Months	**< 0.0001**	0.3654	0..9989	**0.0086**
1 Month vs. 3 Months	0.2031	**0.0586**	**0.0014**	**< 0.0001**

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 14. Scheffe Multi Comparisons For Photac-Fil Quick Bottom Surface Hardness Over Storage Time

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	**< 0.0001**	**< 0.0001**	**0.001**	0.366
24-Hour vs. I Month	**< 0.0001**	**< 0.0001**	**< 0.0001**	**0.028**
24-Hour vs. 3 Months	**< 0.0001**	**< 0.0001**	**< 0.0001**	0.032
1 Week vs. 1 Month	**< 0.0001**	**< 0.0001**	**< 0.0001**	0.491
1 Week vs. 3 Months	**< 0.0001**	**< 0.0001**	0.629	0.524
1 Month vs. 3 Months	0.337	**< 0.0001**	**< 0.0001**	0.99

n = 5
Results shaded red are considered significant at a 95% confidence interval

With analysis of the Photac-Fil Quick bottom surface hardness over the storage times, ANOVA also identified a significant change in KHN with all thicknesses: 2 mm (p < 0.0001), 3 mm (p < 0.0001), 4 mm (p < 0.0001), and 5 mm (p = 0.01). Results of the Scheffe *post hoc* multi comparison test for each of these groups can be seen in Table 14.

The mean bottom/top KHN ratio for the Photac-Fil Quick groups over the storage time can be seen in Table 15. ANOVA analysis of each thickness over the different storage times identified a significant difference within the 2 mm (p = 0.02), 3 mm (p = 0.055), 4 mm (p < 0.0001), and 5

mm samples ($p = 0.003$). When the change in bottom/top KHN ratios were analyzed by two-way ANOVA as a function of specimen thickness and storage time, a significant difference was identified ($p < 0.0001$) with a significant interaction also identified between the effects of time and thickness ($p < 0.0001$). Results of the Scheffe *post hoc* analysis can be seen in Table 16.

Table 15. Photac-Fil Quick Mean Bottom/Top KHN Ratios (%)

	24 Hours	1 Week	1 Month	3 Months
2mm	82.8	87.9	92.1	91.6
sd	5.9	4.7	4.3	2.9
3mm	78.8	83.6	86.8	80.9
sd	5.5	4.7	4.2	2.5
4mm	70.8	81.3	80.6	65.6
sd	2.6	2.9	4.6	4.0
5mm	75.4	77.8	61.7	62.7
sd	10.5	6.3	4.1	6.0

n = 5

Table 16. Scheffe Multi Comparisons For Photac-Fil Quick Mean Bottom/Top KHN Ratios

Comparisons	Thickness			
	2 mm	3 mm	4 mm	5 mm
	p value			
24-Hour vs. 1 Week	0.402	0.415	**0.003**	0.961
24-Hour vs. I Month	**0.042**	0.075	**0.006**	0.056
24-Hour vs. 3 Months	0.058	0.901	0.201	0.083
1 Week vs. 1 Month	0.569	0.728	0.992	**0.021**
1 Week vs. 3 Months	0.663	0.810	**< 0.0001**	**0.032**
1 Month vs. 3 Months	0.999	0.249	**< 0.0001**	0.997

n = 5
Results shaded red are considered significant at a 95% confidence interval

Differential Scanning Calorimetry

Specific Heat Determination: Data concerning the specific heat determinations can be found in Tables 106 – 108,

Table 17. Vitremer Mean Specific Heat Results (J/g°C)

Time Period	2mm	3mm	4mm
Immediate	1.21 (0.06)	1.06 (0.03)	0.96 (0.04)
24 Hours	1.22 (0.09)	1.05 (0.05)	0.92 (0.09)
1 Week	1.28 (0.02)	1.10 (0.04)	0.98 (0.03)
1 Month	1.26 (0.02)	1.12 (0.02)	1.04 (0.05)
3 Months	1.36 (0.08)	1.23 (0.11)	1.15 (0.04)

n = 5

Appendix C. The mean specific heat determination results for Vitremer as per thickness and time period can be seen in Table 17. For all storage time periods, the 2-mm thickness samples exhibited higher specific heat than the 3- or 4-mm thick samples. Two-way ANOVA analysis of the Vitremer specific heat results as a function of thickness over storage time identified significant differences in both thickness and time ($p < 0.0001$) without a significant interaction ($p = 0.690$). Accordingly, Scheffe analysis found that over the storage times there were significant differences between in Vitremer specific heat values between all thicknesses ($p < 0.0001$) with significant differences in specific heat noted between the three-month and all of the other times ($p < 0.0001$). Results of the Scheffe *post hoc* testing for the Vitremer groups can be seen in Table 18. One-way ANOVA of the sample specific heat per thickness over the different storage times identified a significant increase within the 2 mm ($p = 0.009$), 3 mm ($p = 0.001$), and 4 mm ($p < 0.0001$) samples.

Table 18. Scheffe Multi Comparisons For Vitremer Specific Heat per Thickness Over Storage Time

Comparisons	Thickness		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.99	0.998	0.911
Immediate vs. I Week	0.508	0.941	0.973
Immediate vs. 1 Month	0.870	0.673	0.328
Immediate vs. 3 Months	**0.025**	**0.008**	**0.001**
24 Hours vs. 1 Week	0.621	0.822	0.598
24 Hours vs. 1 Month	0.935	0.483	0.078
24 Hours vs. 3 Months	**0.038**	**0.004**	**< 0.0001**
1 Week vs. 1 Month	0.967	0.977	0.656
1 Week vs. 3 Months	0.481	**0.046**	**0.003**
1 Month vs. 3 Months	0.180	0.147	0.108

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 19. Fuji II LC Mean Specific Heat Results (J/g°C)

Time Period	2mm	3mm	4mm
Immediate	1.04 (0.02)	0.93 (0.03)	0.83 (0.03)
24 Hours	1.21 (0.01)	0.97 (0.02)	0.91 (0.02)
1 Week	1.17 (0.02)	1.07 (0.05)	1.02 (0.04)
1 Month	1.16 (0.08)	0.97 (0.03)	0.96 (0.03)
3 Months	1.05 (0.17)	0.99 (0.03)	0.97 (0.05)

n = 5

The mean specific heat determination results for Fuji II LC as per thickness and storage time can be seen in Table 19. Two-way ANOVA

analysis of the Fuji II LC specific heat results as a function of thickness and storage time identified significant differences with both time and thickness ($p < 0.0001$) and identified a significant interaction between the two factors ($p = 0.003$). The results of the Scheffe multi comparison test concerning sample storage time can be seen in Table X. One-way ANOVA of the different thicknesses over the different storage times identified a significant change within the 2 mm ($p = 0.013$), 3 mm ($p < 0.0001$), and 4 mm samples ($p < 0.0001$). Results of the Scheffe *post hoc* analysis for each of the thicknesses can be seen in Table 20.

Table 20. Scheffe Multi Comparisons For Fuji II LC Specific Heat per Thickness Over Storage Time

Comparisons	Thickness		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	**0.032**	0.367	**0.020**
Immediate vs. I Week	0.132	**< 0.0001**	**< 0.0001**
Immediate vs. 1 Month	0.184	0.562	**< 0.0001**
Immediate vs. 3 Months	0.999	0.137	**< 0.0001**
24 Hours vs. 1 Week	0.953	**0.006**	**0.006**
24 Hours vs. 1 Month	0.896	0.997	0.424
24 Hours vs. 3 Months	0.052	0.976	0.305
1 Week vs. 1 Month	0.999	**0.003**	0.239
1 Week vs. 3 Months	0.196	**0.023**	0.342
1 Month vs. 3 Months	0.265	0.884	0.999

n = 5

Results shaded red are considered significant at a 95% confidence interval

Table 21. Photac-Fil Quick Mean Specific Heat Results (J/g°C)

Time Period	2mm	3mm	4mm
Immediate	1.08 (0.03)	0.93 (0.05)	0.83 (0.02)
24 Hours	1.19 (0.04)	1.11 (0.03)	0.89 (0.06)
1 Week	1.05 (0.12)	0.93 (0.03)	0.95 (0.03)
1 Month	1.08 (0.11)	1.00 (0.04)	0.92 (0.06)
3 Months	1.16 (0.05)	1.02 (0.01)	0.97 (0.03)

n = 5

The mean specific heat determination results for Photac-Fil Quick can be seen in Table 21. Two-way ANOVA analysis of the specific heat changes as a

function of both time and thickness identified significant specific heat changes with the Photac-Fil Quick samples for both time and thickness ($p < 0.0001$) with a significant interaction between the two factors ($p = 0.002$). The results of the Scheffe *post hoc* analysis can be seen in Table 22. One-way ANOVA did not identify a significant specific heat difference with the 2 mm samples over the storage time ($p = 0.65$), but identified a significant difference with the 3 mm ($p < 0.0001$) and 4 mm samples ($p = 0.001$).

Table 22. Scheffe Multi Comparisons For Photac-Fil Quick Specific Heat Over Storage Time

Comparisons	Thickness		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.355	< 0.0001	0.410
Immediate vs. I Week	0.994	0.999	0.011
Immediate vs. 1 Month	0.999	0.091	0.084
Immediate vs. 3 Months	0.634	0.009	0.003
24 Hours vs. 1 Week	0.182	< 0.0001	0.377
24 Hours vs. 1 Month	0.372	0.002	0.888
24 Hours vs. 3 Months	0.989	0.025	0.136
1 Week vs. 1 Month	0.992	0.141	0.888
1 Week vs. 3 Months	0.391	0.015	0.972
1 Month vs. 3 Months	0.655	0.825	0.554

n = 5
Results shaded red are considered significant at a 95% confidence interval

Differential Scanning Calorimetry Thermal Scan:

The complete data detailing the differential scanning calorimetry thermal results and peak temperatures can be found in Appendix D, Tables 109 – 111.

The mean results for the Vitremer thermal scan for each thickness and storage time period can be seen in Table 23. The enthalpy results are listed as negative because it was an endothermic phenomenon.

Table 23. Vitremer Thermal Scan Mean Results (J/g)

Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	-2.97	0.75	-40.78	6.62	-47.26	8.52
24 Hours	-27.39	8.27	-47.95	4.12	-54.99	5.62
1 Week	-43.33	6.51	-64.18	6.42	-67.69	8.51
1 Month	-49.72	4.26	-88.69	10.39	-103.45	16.39
3 Months	-90.03	13.82	-103.56	20.73	-104.17	35.08

n = 5

Table 24. Scheffe Multi Comparisons For Vitremer Differential Scanning Calorimetry Thermal Results

Comparisons	Thickness		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.003	0.935	0.985
Immediate vs. I Week	< 0.0001	0.114	0.652
Immediate vs. 1 Month	< 0.0001	< 0.0001	0.008
Immediate vs. 3 Months	< 0.0001	< 0.0001	0.007
24 Hours vs. 1 Week	0.077	0.417	0.912
24 Hours vs. 1 Month	0.007	0.002	0.025
24 Hours vs. 3 Months	< 0.0001	< 0.0001	0.023
1 Week vs. 1 Month	0.808	0.089	0.149
1 Week vs. 3 Months	< 0.0001	0.002	0.136
1 Month vs. 3 Months	< 0.0001	0.502	0.999

n = 5
Results shaded red are considered significant at a 95% confidence interval

Two-way ANOVA analysis of the Vitremer enthalpy results as a factor of both thickness and storage time identified significant changes concerning both thickness ($p < 0.0001$) and time ($p < 0.0001$) but did not identify any significant interactions between the two factors ($p = 0.144$). The Scheffe *post hoc* analysis can be seen in Table 24. Using one-way ANOVA to analyze thermal changes of each thickness as a function of time, a significant difference was identified within the 2 mm ($p < 0.0001$), 3 mm ($p < 0.0001$), and 4 mm ($p < 0.0001$) samples as the respective samples aged.

The results of the mean peak temperature associated with the endothermic peak of the thermal scan for the Vitremer samples can be seen in Table 25. Two-way ANOVA analysis of the data for both thickness and storage time identified significantly different peak temperatures for both sample thickness and storage time ($p < 0.0001$) and indicated significant interactions between the two factors ($p < 0.0001$).

Table 25. Vitremer Thermal Scan Mean Peak Temperature Results (°C)						
Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	182.94	4.80	157.83	1.99	150.72	9.17
24 Hours	108.02	2.91	130.81	8.85	133.52	2.53
1 Week	110.68	3.25	134.56	5.79	133.71	2.84
1 Month	114.63	2.65	132.05	0.96	131.49	1.21
3 Months	121.54	3.19	129.78	1.68	130.69	4.52

n = 5

One-way ANOVA of the data identified significant differences for the individual thicknesses over storage time revealed significant mean peak temperature differences between the 2 mm and 3 mm ($p = 0.012$) as well as between the 2 mm and 4 mm specimens ($p = 0.006$) but not between the 3 mm and 4mm specimens ($p = 0.924$). Results of the Scheffe multicomparison tests can be seen in Tables 26 and 27.

Table 26. Scheffe Multi Comparisons For Vitremer Differential Scanning Calorimetry Thermal Peak Results			
	Thickness		
Comparisons	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	< 0.0001	0.935	0.002
Immediate vs. I Week	< 0.0001	0.114	0.002
Immediate vs. 1 Month	< 0.0001	< 0.0001	0.001
Immediate vs. 3 Months	< 0.0001	< 0.0001	< 0.0001
24 Hours vs. 1 Week	0.824	0.879	0.999
24 Hours vs. 1 Month	0.093	0.998	0.986
24 Hours vs. 3 Months	< 0.0001	0.999	0.953
1 Week vs. 1 Month	0.525	0.969	0.980
1 Week vs. 3 Months	0.002	0.752	0.941
1 Month vs. 3 Months	0.074	0.979	0.999

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 27. Scheffe Multi Comparisons For Vitremer Differential Scanning Calorimetry Thermal Peak Results					
	Storage Time				
Comparisons	Immediate	24 Hour	One Week	One Month	Three Months
	p value				
2 mm vs. 3 mm	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.012
2 mm vs. 4 mm	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.006
3 mm vs. 4 mm	0.238	0.790	0.958	0.890	0.924

n = 5
Results shaded red are considered significant at a 95% confidence interval

The mean enthalpy results for the Fuji II LC samples can be observed in Table 28.

Table 28. Fuji II LC Thermal Scan Mean Results (J/g)

Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	-15.37	12.64	-33.53	3.88	-34.48	2.46
24 Hours	-36.87	4.77	-34.65	5.90	-38.81	3.43
1 Week	-52.41	3.35	-80.03	1.46	-72.90	1.96
1 Month	-46.12	10.50	-76.58	5.54	-78.28	4.83
3 Months	-47.66	7.24	-74.94	2.71	-81.54	5.63

n = 5

Table 29. Scheffe Multi Comparisons For Fuji II LC Differential Scanning Calorimetry Thermal Results			
	Thickness		
Comparisons	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.014	0.998	0.658
Immediate vs. I Week	< 0.0001	< 0.0001	< 0.0001
Immediate vs. 1 Month	< 0.0001	< 0.0001	< 0.0001
Immediate vs. 3 Months	< 0.0001	< 0.0001	< 0.0001
24 Hours vs. 1 Week	0.116	< 0.0001	< 0.0001
24 Hours vs. 1 Month	0.570	< 0.0001	< 0.0001
24 Hours vs. 3 Months	0.421	< 0.0001	< 0.0001
1 Week vs. 1 Month	0.843	0.885	0.459
1 Week vs. 3 Months	0.936	0.589	0.080
1 Month vs. 3 Months	0.999	0.989	0.842

n = 5
Results shaded red are considered significant at a 95% confidence interval

Two-way ANOVA of the Fuji II LC enthalpy results identified a significant difference for both thickness and storage time ($p < 0.0001$) as well as an interaction between the effects of time and thickness ($p < 0.0001$). One-way ANOVA of the Fuji II LC samples as a function of individual thickness over time

revealed a significant difference with the 2 mm ($p < 0.0001$), 3 mm ($p < 0.0001$), and 4 mm samples ($p < 0.0001$). Results of the Scheffe multi comparison analysis can be seen in Table 29.

Table 30. Scheffe Multi Comparisons For Fuji II LC Differential Scanning Calorimetry Thermal Results

Comparisons	Storage Time				
	Immediate	24 Hour	One Week	One Month	Three Months
	p value				
2 mm vs. 3 mm	0.011	0.799	< 0.0001	< 0.0001	< 0.0001
2 mm vs. 4 mm	0.008	0.842	< 0.0001	< 0.0001	< 0.0001
3 mm vs. 4 mm	0.982	0.471	0.003	0.941	0.238

n = 5
Results shaded red are considered significant at a 95% confidence interval

One-way ANOVA of the Fuji II thickness per time period identified a significant difference between the different thicknesses at the immediate ($p < 0.004$), one-week ($p < 0.0001$), one-month ($p < 0.0001$), and three-month time groups ($p < 0.0001$). A significant difference was not noted in the 24-hour sample group ($p = 0.470$). Results of the *post hoc* tests can be seen in Table 30.

The mean results of the peak temperature associated with the endothermic peak during the thermal scan for the Fuji II LC samples can be seen in Table 31.

Table 31. Fuji II LC Thermal Scan Mean Peak Temperature Results (°C)

Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	142.43	54.93	174.70	3.13	163.61	1.22
24 Hours	126.53	17.29	146.68	9.81	141.19	2.63
1 Week	126.15	12.76	147.29	1.28	137.95	1.35
1 Month	128.58	7.66	142.89	2.23	135.63	3.98
3 Months	132.87	9.81	141.71	1.00	138.86	4.03

n = 5

Two-way ANOVA of the mean Fuji II LC enthalpy peak identified significant differences within the samples ($p < 0.0001$) for both thickness and storage time period but did not indicate a significant interaction between the two factors ($p = 0.911$). One-way ANOVA of the Fuji II LC

Table 32. Scheffe Multi Comparisons For Fuji II LC Differential Scanning Calorimetry Thermal Peak Results			
	Thickness		
Comparisons	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.926	< 0.0001	< 0.0001
Immediate vs. I Week	0.919	< 0.0001	< 0.0001
Immediate vs. 1 Month	0.954	< 0.0001	< 0.0001
Immediate vs. 3 Months	0.988	< 0.0001	< 0.0001
24 Hours vs. 1 Week	0.999	0.999	0.645
24 Hours vs. 1 Month	0.999	0.865	0.163
24 Hours vs. 3 Months	0.998	0.706	0.860
1 Week vs. 1 Month	0.999	0.789	0.861
1 Week vs. 3 Months	0..997	0.611	0.995
1 Month vs. 3 Months	0.999	0.998	0.655
n = 5 Results shaded red are considered significant at a 95% confidence interval			

separate thicknesses as a function of storage time did not identify a significant difference in mean peak temperature with the 2 mm ($p = 0.865$), but identified a significant change in peak temperature within the 3 mm ($p < 0.0001$) and 4 mm samples ($p < 0.0001$) as a function of storage time. Results of the *post hoc* analysis can be seen in Table 32.

One-way ANOVA analysis of the Fuji II LC thermal scan peak temperature as a function of storage time did not identify a significant difference in peak temperature with the immediate group ($p = 0.301$), 24-hour group ($p = 0.053$), or the three-month samples ($p = 0.116$). However, a significant change of peak enthalpy temperature was found within the one-week samples ($p = 0.003$) and the one-month samples ($p = 0.004$). Results of the Scheffe *post hoc* analysis can be seen in Table 33.

Table 33. Scheffe Multi Comparisons For Fuji II LC Differential Scanning Calorimetry Thermal Peak Temperature Results					
	Storage Time				
Comparisons	Immediate	24 Hour	One Week	One Month	Three Months
	p value				
2 mm vs. 3 mm	0.311	0.061	0.003	0.004	0.125
2 mm vs. 4 mm	0.588	0.194	0.81	0.153	0.352
3 mm vs. 4 mm	0.861	0.772	0.184	0.139	0.776
n = 5 Results shaded red are considered significant at a 95% confidence interval					

The mean enthalpy results of the Photac-Fil Quick samples can be seen in Table 34.

Table 34. Photac-Fil Quick Mean Thermal Scan Results (J/g)

Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	-7.76	7.66	-34.08	5.84	-43.54	2.60
24 Hours	-34.97	2.40	-70.90	3.15	-58.27	8.62
1 Week	-46.79	13.72	-67.72	4.58	-70.99	5.58
1 Month	-47.73	6.28	-74.03	2.00	-77.16	3.76
3 Months	-59.08	7.40	-92.25	2.39	-99.95	2.44

n = 5

Two-way ANOVA of the mean enthalpy as a function of time and samples thickness identified a significant difference for both time and thickness ($p < 0.0001$) and an interaction between the two factors ($p = 0.002$). One-way ANOVA analysis of the individual thicknesses over the storage time revealed a significant difference with the 2 mm ($p < 0.0001$), 3 mm ($p < 0.0001$), and 4 mm samples ($p < 0.0001$) as they aged over the storage times. Results of the Scheffe *post hoc* testing can be seen in Table 35. One-way ANOVA analysis of the change in thermal enthalpy for the collective groups as a function of storage time identified significant differences within the different thicknesses at the immediate ($p < 0.0001$), 24-hour ($p < 0.0001$), one-week ($p = 0.003$), one-month ($p < 001$), and three-month ($p < 0.0001$) storage times. The results of the multi comparison testing can be seen in Table 36.

Table 35. Scheffe Multi Comparisons For Photac-Fil Quick Differential Scanning Calorimetry Thermal Results

Comparisons	Thickness		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.001	< 0.0001	0.014
Immediate vs. I Week	< 0.0001	< 0.0001	< 0.0001
Immediate vs. 1 Month	< 0.0001	< 0.0001	< 0.0001
Immediate vs. 3 Months	< 0.0001	< 0.0001	< 0.0001
24 Hours vs. 1 Week	0.319	0.849	0.041
24 Hours vs. 1 Month	0.250	0.855	0.001
24 Hours vs. 3 Months	0.005	< 0.0001	< 0.0001
1 Week vs. 1 Month	0.999	0.292	0.588
1 Week vs. 3 Months	0.283	< 0.0001	< 0.0001
1 Month vs. 3 Months	0.358	< 0.0001	< 0.0001

n = 5
Results shaded red are considered significant at a 95% confidence interval

Table 36. Scheffe Multi Comparisons For Photac-Fil Quick Differential Scanning Calorimetry Thermal Results

Comparisons	Storage Time				
	Immediate	24 Hour	One Week	One Month	Three Months
	p value				
2 mm vs. 3 mm	< 0.0001	< 0.0001	0.012	< 0.0001	< 0.0001
2 mm vs. 4 mm	< 0.0001	< 0.0001	0.005	< 0.0001	< 0.0001
3 mm vs. 4 mm	0.085	0.021	0.856	0.569	0.077

n = 5
Results shaded red are considered significant at a 95% confidence interval

Results of the Photac-Fil Quick mean peak temperature of the DSC thermal scan can be seen in Table 37. Two-way ANOVA analysis of the mean thermal peak temperature values as a function of storage time and thickness indicated significant differences within the samples ($p < 0.0001$) with interactions identified between the two factors ($p < 0.0001$).

Table 37. Photac-Fil Quick Thermal Scan Mean Peak Temperature Results (°C)

Time Period	2mm	sd	3mm	sd	4mm	sd
Immediate	123.27	49.51	194.33	4.16	174.59	1.06
24 Hours	134.69	23.75	149.37	5.59	154.31	3.36
1 Week	141.22	4.42	145.34	2.08	143.29	1.79
1 Month	136.69	2.91	140.14	0.42	141.02	0.91
3 Months	129.47	4.01	137.51	0.51	137.43	1.91

n = 5

One-way ANOVA of the mean peak values for Photac-Fil Quick for the individual sample thicknesses over the storage times did not identify a significant difference within the 2 mm samples ($p = 0.813$), but found a significant change in temperature within the 3 mm samples ($p < 0.0001$), and the 4 mm samples ($p < 0.0001$) over the storage times. Results of the Scheffe *post hoc* analysis can be seen in Table 38.

Table 38. Scheffe Multi Comparisons For Photac-Fil Quick Differential Scanning Calorimetry Thermal Peak Results			
Comparisons	**Thickness**		
	2 mm	3 mm	4 mm
	p value		
Immediate vs. 24-Hours	0.968	**< 0.0001**	**< 0.0001**
Immediate vs. I Week	0.855	**< 0.0001**	**< 0.0001**
Immediate vs. 1 Month	0.944	**< 0.0001**	**< 0.0001**
Immediate vs. 3 Months	0.997	**< 0.0001**	**< 0.0001**
24 Hours vs. 1 Week	0.996	0.562	**< 0.0001**
24 Hours vs. 1 Month	0.999	**0.015**	**< 0.0001**
24 Hours vs. 3 Months	0.998	**0.001**	**< 0.0001**
1 Week vs. 1 Month	0.999	0.315	0.638
1 Week vs. 3 Months	0..995	**0.049**	**0.012**
1 Month vs. 3 Months	0.994	0.858	0.214

n = 5
Results shaded are considered significant at a 95% confidence interval

One-way ANOVA of the Photac-Fil Quick mean thermal peak values for the samples as a function of storage time identified a significant difference in thermal peak values within the immediate ($p = 0.006$), one-month ($p = 0.006$), and three-month ($p = 0.001$) storage groups. However, a significant difference was not found at 24-hours ($p = 0.121$) and at one-week ($p = 0.155$). Results of the *post hoc* analysis can be seen in Table 39.

Table 39. Scheffe Multi Comparisons For Photac-Fil Quick Differential Scanning Calorimetry Thermal Peak Temperature Results					
Comparisons	**Storage Time**				
	Immediate	24 Hour	One Week	One Month	Three Months
	p value				
2 mm vs. 3 mm	**0.007**	0.305	0.155	**0.033**	**0.002**
2 mm vs. 4 mm	**0.047**	0.139	0.589	**0.009**	**0.002**
3 mm vs. 4 mm	0.569	0.864	0.596	0.746	0.999

n = 5
Results shaded are considered significant at a 95% confidence interval

Differential Scanning Calorimetry Thermal Weight Change

The complete data for the weight changes during thermal analysis can be seen in Appendix E, Tables 112 – 116 for Vitremer, Tables 117 – 121 for Fuji II LC, and Tables 122 – 126 for Photac-Fil Quick.

For all tables, "H20 Gain" represents the sample weight difference noted between fabrication and the end of storage in 100% humidity. "H20 Loss" represents the amount of weight change noted during the specific heat determinations, while "Net H20" represents the difference between water gain during storage and water loss during the specific heat determinations. "Scan Loss" represents the weight change during the 37 – 240 °C thermal scan, and "Total Loss" represents the sum of weight loss during specific heat determinations and thermal scan. "Total/Gain" represents the ratio (percent) of entire weight loss to water gain, and "Scan/Gain" likewise represents the ratio of weight loss during the DSC thermal scan to water gain. The latter two analyses were undertaken to explore any possible relationships between the amount of water gained and weight loss as a function of storage time.

Some assumptions were made during the formulation of the weight determinations. First, it was assumed that any weight change during the specific heat determinations would be due to water loss, presumably of the loosely-bound nature. This assumption was reinforced that the DSC chamber is constantly purged with low-humidity nitrogen gas and that temperature span of the specific heat determination (20 º - 60 º C) would not be sufficient to cause reasonable loss of any HEMA methacrylate components (BP 120 ºC[62]) that may be present as well as other glass-ionomer components. The second assumption is that the during the DSC thermal scan (37 º - 240 ºC) the majority of weight loss is due to water of the more firmly-bound nature. This assumption is albeit made with the knowledge that some polyacrylic acids used in resin-modified glass-ionomer restorative materials have a boiling point (~ 210-220 ºC[63]) at the higher end of the thermal scan used in this evaluation. Accordingly, any material loss associated with an endothermal peak above 100 °C and below the polyacrylic acid boiling points should be assumed to be mostly due to water. Furthermore, the second assumption was reinforced with the results of pilot studies that revealed no endothermal peaks evident during the latter end of the DSC thermal scans. A third assumption made in the DSC weight change formulations was that any RMGI polymer formation would be stable during the temperature range of the DSC

thermal scan. This last supposition was established after pilot studies revealed that RMGI materials required temperatures in excess of 400 °C to degrade during DSC thermal scans.

The mean weight change during the thermal analysis for Vitremer is presented in Table 40. Two-way ANOVA identified significant gain in water ($p < 0.0001$) in the Vitremer samples as a function of storage time, but a difference was not noted ($p = 0.891$) between the different sample thicknesses, as well as no interactions between the factors of time and thickness ($p = 0.389$). The immediate samples were not included in any of the water gain analyses since these samples did not have the opportunity to gain water and could abnormally skew the statistical results. The results of the *post hoc* tests concerning Vitremer water gain can be seen in Table 41.

Table 40. Vitremer Mean Thermal Weight Change (% Wt)

		H2O Gain	SD	H2O Loss	SD	Net H2O	SD	Scan Loss	SD	Total Loss	SD	Total/H2O gain	SD	Scan/H2O Gain	SD
Immediate	2mm	0.00	0.00	1.76	0.44	-1.76	0.44	4.78	0.51	6.46	0.91				
	3mm	0	0	0.96	0.18	-0.96	0.18	6.32	0.81	7.22	0.95				
	4mm	0	0	0.67	0.14	-0.67	0.13	6.43	0.42	7.1	0.41				
24 Hours	2mm	1.22	0.17	2.77	0.37	-1.55	0.33	5.11	0.57	7.75	0.89	647.87	96.39	415.94	61.41
	3mm	0.79	0.09	1.37	0.24	-0.58	0.28	5.85	0.71	7.53	0.63	961.68	107.46	785.78	70.40
	4mm	0.76	0.09	0.86	0.05	-0.10	0.08	6.45	0.52	7.26	0.47	983.33	172.84	867.38	164.16
One Week	2mm	2.37	0.21	2.47	0.22	-0.1	0.09	6.26	0.59	8.57	0.39	372.76	45.54	266.06	44.75
	3mm	2.56	0.17	2.03	0.25	0.53	0.15	7.25	0.35	9.14	0.46	366.69	7.78	285.48	13.15
	4mm	1.01	0.07	0.95	0.13	0.06	0.13	7.03	0.95	8.19	0.72	818.08	80.07	722.63	69.35
One Month	2mm	2.58	3.06	1.87	0.17	0.72	3.15	5.85	0.87	7.96	0.45	557.48	265.46	424.84	201.13
	3mm	2.79	0.19	1.80	0.40	0.99	0.33	7.69	1.15	9.87	0.46	364.60	18.54	298.46	29.20
	4mm	3.40	1.51	1.97	0.92	1.43	0.65	8.48	1.10	10.28	1.84	337.96	77.67	278.62	82.71
Three Months	2mm	4.29	1.73	3.38	0.94	0.92	0.98	8.94	0.98	11.51	2.1	330.18	129.42	243.38	115.88
	3mm	5.08	1.99	3.18	1.03	1.9	1.25	9.02	1.96	11.9	2.33	275.18	97.03	206.20	91.58
	4mm	5.47	2.44	2.46	1.74	3.02	0.98	10.38	0.42	12.46	1.68	261.40	87.49	219.08	89.88

n = 5

Table 41. Scheffe Multi Comparisons For Vitremer Water Gain	
Comparisons	p value
2 mm vs. 3 mm	0.913
2 mm vs. 4 mm	0.999
3 mm vs. 4 mm	0.921
24 Hours vs. 1 Week	0.235
24 Hours vs. 1 Month	0.005
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.393
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.002
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Two-way ANOVA analysis of the Vitremer samples water loss during the specific heat determinations identified a significant difference ($p < 0.0001$) in water loss between the samples for both factors storage time and sample thickness with an interaction noted ($p = 0.038$) between the two factors. The 2 mm samples were noted to lose significantly more water than the other thicknesses and more water was lost as storage time increased. The results of the Scheffe *post hoc* analysis per sample thickness and storage time can be seen in Table 42.

Table 42. Scheffe Multi Comparisons For Vitremer Water Loss During Specific Heat Determinations	
Comparisons	p value
2 mm vs. 3 mm	0.006
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.014
Immediate vs. 24 Hours	0.244
Immediate vs. 1 Week	0.069
Immediate vs. 1 Month	0.047
Immediate vs. 3 Months	<0.0001
24 Hours vs. 1 Week	0.979
24 Hours vs. 1 Month	0.941
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.999
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.001
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Analysis of the net water retention during specific heat determination for the Vitremer samples as a function of sample thickness and storage time determined that the Vitremer samples retained significantly more during the specific heat determinations as storage time increased ($p < 0.0001$) and as the samples increased in thickness ($p = 0.001$) without an interaction in the factors of storage time and specimen thickness ($p = 0.456$). Itemized results of the *post hoc* analysis can be seen in Table 43.

Table 43. Scheffe Multi Comparisons For Vitremer Net Water Retention During Specific Heat Determinations	
Comparisons	**p value**
2 mm vs. 3 mm	**0.038**
2 mm vs. 4 mm	**0.001**
3 mm vs. 4 mm	0.401
Immediate vs. 24 Hours	0.885
Immediate vs. 1 Week	**0.018**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	0.188
24 Hours vs. 1 Month	**0.001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.254
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	0.130
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Two-way ANOVA of Vitremer weight loss during the DSC thermal scan identified significant changes in weight as a function of thickness and storage time ($p < 0.0001$), without an interaction between the two factors ($p = 0.226$). The thicker samples were noted to exhibit more weight loss and increased weight loss was also noted with longer storage times. The results of the *post hoc* analysis can be seen in Table 44.

Analysis of the total weight loss (specific heat determination loss + thermal scan loss) identified a significant increase in weight loss as a function of storage time ($p < 0.0001$) but did not identify a significant difference when analyzed as per specimen thickness ($p = 0.085$). Furthermore, no interaction between the factors was identified ($p = 0.238$). The results of the multi comparison *post hoc* testing can be seen in Table 45.

Table 44. Scheffe Multi Comparisons For Vitremer DSC Scan Weight Loss	
Comparisons	**p value**
2 mm vs. 3 mm	**0.038**
2 mm vs. 4 mm	**0.001**
3 mm vs. 4 mm	0.401
Immediate vs. 24 Hours	0.885
Immediate vs. 1 Week	**0.018**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	0.188
24 Hours vs. 1 Month	**0.001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.254
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	0.130
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Table 45. Scheffe Multi Comparisons For Vitremer Total Weight Loss	
Comparisons	**p value**
2 mm vs. 3 mm	0.124
2 mm vs. 4 mm	0.259
3 mm vs. 4 mm	0.925
Immediate vs. 24 Hours	0.736
Immediate vs. 1 Week	**0.005**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	0.150
24 Hours vs. 1 Month	**0.004**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.656
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**<0.0001**
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Two-way ANOVA analysis of the ratio (expressed as a percentage) of total weight loss to water gain of the Vitremer samples identified significant differences ($p < 0.0001$) among both factors of specimen thickness and storage time with a significant interaction indicated between the two factors ($p < 0.0001$). In summary, there were significant differences between the 2 mm and 4 mm specimens and all storage time periods demonstrated significant reduction in the ratio except between the one-week and one-month storage time. Results of the *post hoc* testing can be seen in Table 46.

Analysis of the ratio of the weight loss observed during the DSC thermal scan to water gain of the Vitremer samples indicated similar results, with significant differences found among the factors of storage time and thickness ($p < 0.0001$) with a significant interaction between the two

factors ($p < 0.0001$). Scheffe *post hoc* comparison results presented similar results as that seen for the total weight loss to water gain ratio evaluation and are posted in Table 47.

Table 46. Scheffe Multi Comparisons For Vitremer Ratio of Total Weight Loss to Water Gain

Comparisons	p value
2 mm vs. 3 mm	0.925
2 mm vs. 4 mm	**0.004**
3 mm vs. 4 mm	**0.010**
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.236
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**0.033**

n = 15
Results shaded red are considered significant at a 95% confidence interval

Table 47. Scheffe Multi Comparisons For Vitremer Ratio of DSC Thermal Scan Weight Loss to Water Gain

Comparisons	p value
2 mm vs. 3 mm	0.218
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	**<0.0001**
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.161
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**0.033**

n = 15
Results shaded red are considered significant at a 95% confidence interval

The mean weight change during the thermal analysis for Fuji II LC is presented in Table 48. Two-way ANOVA analysis of Fuji II LC water gain (except the immediate groups) as a function of thickness and storage time, identified significant differences ($p < 0.0001$) for both factors, with an interaction indicated between the two factors ($p = 0.001$). Interesting, the 2 mm samples demonstrated more water gain than the thicker samples and although water gain increased as storage time increased, water gain was observed to peak at the one-week storage time. Results of the *post hoc* testing can be seen in Table 49.

Table 48. Fuji II LC Mean Thermal Weight Change (%Wt)

		H2O Gain	SD	H2O Loss	SD	Net H2O	SD	Scan Loss	SD	Total Loss	SD	Total/H2O Gain	SD	Scan/H2O Gain	SD
Immediate	2mm	0.00	0.00	0.70	0.12	-0.70	0.12	3.88	0.50	4.56	0.40				
	3mm	0.00	0.00	0.62	0.36	-0.62	0.36	4.45	0.16	5.04	0.29				
	4mm	0.00	0.00	0.32	0.06	-0.32	0.06	4.75	0.15	5.05	0.21				
24 Hours	2mm	3.46	0.64	3.04	0.37	0.43	0.41	5.17	0.28	8.38	1.14	245.77	38.34	153.78	30.35
	3mm	1.01	0.17	0.966	0.12	0.05	0.11	4.73	0.61	5.88	0.18	596.46	88.72	499.72	80.53
	4mm	1.04	0.15	0.85	0.09	0.19	0.11	5.05	0.22	5.85	0.19	576.00	84.76	493.20	79.32
One Week	2mm	4.94	1.47	3.57	1.35	1.37	0.23	5.98	0.17	9.33	1.31	205.38	29.28	130.97	36.36
	3mm	4.29	0.81	2.21	0.63	2.08	0.22	6.49	0.79	8.88	0.62	220.46	31.48	167.58	37.67
	4mm	3.71	1.08	1.79	0.96	1.92	0.32	6.64	0.22	7.91	1.05	244.35	37.64	195.83	48.78
One Month	2mm	4.14	1.06	2.87	1.17	1.27	0.25	5.92	0.34	8.61	0.86	223.25	31.28	152.89	40.66
	3mm	3.63	0.40	1.51	0.43	2.12	0.18	7.11	0.18	8.51	0.30	244.84	17.11	202.15	23.81
	4mm	3.22	0.08	1.04	0.14	2.18	0.07	7.11	0.11	8.08	0.21	259.10	4.45	226.88	5.75
Three Months	2mm	4.29	1.73	3.38	0.94	0.92	0.98	8.94	0.98	11.51	2.1	317.83	44.02	239.90	26.19
	3mm	5.08	1.99	3.18	1.03	1.9	1.25	9.02	1.96	11.9	2.33	302.09	10.65	261.45	11.27
	4mm	5.47	2.44	2.46	1.74	3.02	0.98	10.38	0.42	12.46	1.68	292.72	9.81	265.02	11.72

n = 5

Table 49. Scheffe Multi Comparisons For Fuji II LC Water Gain	
Comparisons	**p value**
2 mm vs. 3 mm	**0.002**
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	0.584
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	0.115
1 Week vs. 1 Month	0.103
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**<0.0001**
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Two-way ANOVA analysis of the Fuji II LC water loss during specific heat determination identified significant weight loss in the samples both when analyzed per thickness and storage time ($p < 0.0001$) with an interaction between the two factors also identified ($p = 0.012$). The results of the Scheffe multi comparison testing can be seen in Table 50.

Table 50. Scheffe Multi Comparisons For Fuji II LC Water Loss During Specific Heat Determinations	
Comparisons	**p value**
2 mm vs. 3 mm	**<0.0001**
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	0.150
Immediate vs. 24 Hours	**<0.0001**
Immediate vs. 1 Week	**<0.0001**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	0.109
24 Hours vs. 1 Week	**0.003**
24 Hours vs. 1 Month	0.942
24 Hours vs. 3 Months	0.308
1 Week vs. 1 Month	**0.030**
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	0.061
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Analysis of the net water retention during specific heat determination of the Fuji II LC samples identified significant differences for both storage time and specimen thickness ($p < 0.0001$) as well as an interaction between both factors ($p < 0.0001$). *Post hoc* analysis identified significant differences for all thickness combinations except between the 3 mm and 4 mm samples and all storage time periods were significantly different except between the one-week and one-month storage times. The results of the multi comparison testing can be seen in Table 51.

Table 51. Scheffe Multi Comparisons For Fuji II LC Net Water Retention During Specific Heat Determinations	
Comparisons	**p value**
2 mm vs. 3 mm	**<0.0001**
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	0.129
Immediate vs. 24 Hours	**<0.0001**
Immediate vs. 1 Week	**<0.0001**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.962
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**<0.0001**

n = 15
Results shaded red are considered significant at a 95% confidence interval

Analysis of the Fuji II LC samples for weight loss during the DSC thermal scan identified significant differences for both storage time and specimen thickness ($p < 0.0001$) as well as an interaction between both factors ($p < 0.0001$). *Post hoc* analysis identified significant differences for all thickness combinations except between the 3 mm and 4 mm samples and all storage time periods were significantly different except between the one-week and one-month and the one-week and three-month storage times. The results of the multi comparison testing can be seen in Table 52. Analysis of the Fuji II LC samples concerning total weight loss (specific heat determination + DSC thermal scan) closely mirrored the results of the DSC thermal scan with significant differences identified ($p < 0.0001$) for both storage time and specimen thickness with an interaction noted between the two factors ($p < 0.0001$). The results of the *post hoc* testing can be seen in Table 53.

Table 52. Scheffe Multi Comparisons For Fuji II LC Weight Loss During DSC Thermal Scan	
Comparisons	**p value**
2 mm vs. 3 mm	**<0.0001**
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	0.183
Immediate vs. 24 Hours	**0.001**
Immediate vs. 1 Week	**<0.0001**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	**<0.0001**
1 Week vs. 1 Month	0.148
1 Week vs. 3 Months	0.881
1 Month vs. 3 Months	**0.012**
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Table 53. Scheffe Multi Comparisons For Fuji II LC Total Weight Loss	
Comparisons	**p value**
2 mm vs. 3 mm	**0.045**
2 mm vs. 4 mm	**<0.0001**
3 mm vs. 4 mm	0.237
Immediate vs. 24 Hours	**0.001**
Immediate vs. 1 Week	**<0.0001**
Immediate vs. 1 Month	**<0.0001**
Immediate vs. 3 Months	**<0.0001**
24 Hours vs. 1 Week	**<0.0001**
24 Hours vs. 1 Month	**<0.0001**
24 Hours vs. 3 Months	0.164
1 Week vs. 1 Month	0.794
1 Week vs. 3 Months	**<0.0001**
1 Month vs. 3 Months	**0.001**
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Two-way ANOVA analysis of the ratio (expressed as a percentage) of total weight loss to water gain of the Fuji II LC samples identified significant differences ($p < 0.0001$) with respect to specimen thickness and storage time and a significant interaction indicated between the two factors ($p < 0.0001$). There were significant differences between the all thickness pairs, except between the 3 mm and 4 mm specimens, and all storage time periods demonstrated significant reduction in the ratio except between the one-week and one-month storage time. Results of the *post hoc* testing can be seen in Table 54.

Analysis of the ratio of the weight loss observed during the DSC thermal scan to water gain of the Fuji II LC samples indicated similar results, with significant differences found among storage time and thickness ($p < 0.0001$) with a significant interaction between the two factors ($p < 0.0001$). Interestingly, for the 3 mm and 4 mm samples, the ratio demonstrated its highest

value at 24 hours, which then decreased at the one-week storage time. At this point, all three thicknesses of the samples demonstrated an increase in the ratio. Scheffe *post hoc* comparison results presented similar results as that seen for the total weight loss to water gain ratio evaluation, and the results are posted in Table 55.

Table 54. Scheffe Multi Comparisons For Fuji II LC Total Weight Loss to Water Gain

Comparisons	p value
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.987
24 Hours vs. 1 Week	<0.0001
24 Hours vs. 1 Month	<0.0001
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.699
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.005

n = 15
Results shaded red are considered significant at a 95% confidence interval

Table 55. Scheffe Multi Comparisons For Fuji II LC DSC Thermal Scan Weight Loss to Water Gain

Comparisons	p value
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.987
24 Hours vs. 1 Week	<0.0001
24 Hours vs. 1 Month	<0.0001
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.335
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.004

n = 15
Results shaded red are considered significant at a 95% confidence interval

The mean results of the Photac-Fil Quick thermal analysis weight changes can be seen in Table 56. Two-way ANOVA analysis of the Photac-Fil Quick samples for water gain (immediate groups excluded) identified a significant increase in weight as a factor of storage time ($p < 0.0001$) but found no significant difference in weight gain as a factor of specimen thickness ($p = 0.323$). There was no significant interaction between the two factors found ($p = 0.106$). Overall results found that the samples demonstrated significant increase in water gain with increase in storage time, with the three-month samples displaying significantly more water uptake than the other samples. Results of the *post hoc* testing can be seen in Table 57.

Table 56. Photac-Fil Quick Mean Thermal Weight Change (%Wt)

		H2O Gain	SD	H2O Loss	SD	Net H2O	SD	Scan Loss	SD	Total Loss	SD	Total/H2O Gain	SD	Scan/H2O Gain	SD
Immediate	2mm	0.00	0.00	0.98	0.16	-0.98	0.16	4.33	0.41	5.26	0.30				
	3mm	0.00	0.00	0.5	0.04	-0.5	0.04	4.31	1.14	4.79	1.11				
	4mm	0.00	0.00	0.31	0.05	-0.31	0.05	5.64	0.13	5.94	0.17				
24 Hours	2mm	1.48	0.43	2.02	0.22	-0.54	0.59	5.42	0.51	7.33	0.66	568.06	293.20	410.74	205.90
	3mm	2.15	0.65	1.64	0.48	0.51	0.27	7.24	0.32	8.76	0.71	441.83	112.12	363.12	106.24
	4mm	1.47	0.52	1.19	0.33	0.27	0.21	6.46	0.58	7.60	0.81	554.79	105.37	470.39	99.24
One Week	2mm	1.61	0.14	1.44	0.49	0.17	0.35	6.06	0.33	7.43	0.27	471.06	33.74	381.99	56.34
	3mm	1.66	0.16	0.96	0.12	0.7	0.09	6.52	0.15	7.41	0.19	457.85	41.40	398.90	41.52
	4mm	1.62	0.1	0.79	0.03	0.83	0.09	6.7	0.23	7.43	0.22	466.27	21.23	416.51	19.64
One Month	2mm	1.78	0.37	1.6	0.2	0.18	0.31	6.13	0.35	7.74	0.25	459.95	111.13	366.01	98.14
	3mm	1.93	0.08	0.95	0.14	0.98	0.10	6.88	0.11	7.76	0.22	408.86	11.05	359.02	10.54
	4mm	1.97	0.45	0.75	0.19	1.22	0.25	7.18	0.13	7.88	0.28	419.86	76.22	379.55	78.24
Three Months	2mm	2.54	0.32	1.86	0.22	0.67	0.27	6.41	0.29	8.16	0.47	332.42	31.92	256.55	24.91
	3mm	2.78	0.18	0.99	0.07	1.79	0.11	7.61	0.12	8.52	0.17	315.32	14.74	278.82	14.64
	4mm	3.64	1.07	0.91	0.12	2.72	0.96	8.05	0.14	8.91	0.17	334.57	158.59	299.44	140.56

n = 5

Table 57. Scheffe Multi Comparisons For Photac-Fil Quick Water Gain	
Comparisons	**p value**
2 mm vs. 3 mm	0.441
2 mm vs. 4 mm	0.663
3 mm vs. 4 mm	0.936
24 Hours vs. 1 Week	0.924
24 Hours vs. 1 Month	0.504
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.189
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.001
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Analysis of Photac-Fil Quick water loss during the specific heat determinations indicated significant differences among sample thickness and storage time ($p < 0.0001$) without an interaction between the two factors ($p = 0.355$). The different sample thicknesses were all significantly different from each other, with the 2 mm samples displaying more water loss than the other two thicknesses ($p < 0.013$). Considering sample storage time, water loss appeared to peak at the 24-hour storage time and then appeared to lessen and become stable, at least for the 3 mm and 4 mm samples. Results of the Scheffe *post hoc* analysis are presented in Table 58.

Table 58. Scheffe Multi Comparisons For Photac-Fil Quick Water Loss During Specific Heat Determinations	
Comparisons	**p value**
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.013
Immediate vs. 24 Hours	<0.0001
Immediate vs. 1 Week	<0.0001
Immediate vs. 1 Month	<0.0001
Immediate vs. 3 Months	<0.0001
24 Hours vs. 1 Week	<0.0001
24 Hours vs. 1 Month	<0.0001
24 Hours vs. 3 Months	0.030
1 Week vs. 1 Month	0.998
1 Week vs. 3 Months	0.260
1 Month vs. 3 Months	0.548
n = 15 Results shaded red are considered significant at a 95% confidence interval	

Analysis of the net water retention of the Photac-Fil Quick samples during the specific heat determinations revealed significant differences for both sample thickness and storage time ($p < 0.0001$) without an interaction between the two factors ($p = 0.168$). Specifically the samples retained more water as sample thickness and storage time increased. Results of the Scheffe multi comparison testing are presented in Table 59.

Table 59. Scheffe Multi Comparisons For Photac-Fil Quick Net Water Retention During Specific Heat Determinations

Comparisons	p value
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.413
Immediate vs. 24 Hours	0.001
Immediate vs. 1 Week	<0.0001
Immediate vs. 1 Month	<0.0001
Immediate vs. 3 Months	<0.0001
24 Hours vs. 1 Week	0.001
24 Hours vs. 1 Month	0.046
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.707
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	<0.0001

n = 15
Results shaded red are considered significant at a 95% confidence interval

Two-way ANOVA analysis of the Photac-Fil Quick samples for total weight loss during specific heat determinations and thermal DSC scan identified significant differences in weight as a function of storage time ($p < 0.0001$) and sample thickness ($p = 0.023$) with an interaction noted between the two factors ($p < 0.0001$). In general, total weight loss increased as storage time increased and sample thickness increased. Results of the *post hoc* testing can be seen in Table 60.

Table 60. Scheffe Multi Comparisons For Photac-Fil Quick Total Weight Loss

Comparisons	p value
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.413
Immediate vs. 24 Hours	0.001
Immediate vs. 1 Week	<0.0001
Immediate vs. 1 Month	<0.0001
Immediate vs. 3 Months	<0.0001
24 Hours vs. 1 Week	0.001
24 Hours vs. 1 Month	0.046
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.707
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	<0.0001

n = 15
Results shaded red are considered significant at a 95% confidence interval

Two-way ANOVA analysis of the Photac-Fil Quick samples for weight loss during the thermal DSC scan similarly to the total loss analysis identified significant differences in weight as a function of storage time ($p < 0.0001$) and sample thickness ($p = 0.0001$) with an interaction noted between the two factors ($p < 0.0001$). In general, total weight loss increased as storage time increased and sample thickness increased. Results of the *post hoc* testing can be seen in Table 61.

Table 61. Scheffe Multi Comparisons For Photac-Fil Quick DSC Thermal Scan Weight Loss	
Comparisons	**p value**
2 mm vs. 3 mm	<0.0001
2 mm vs. 4 mm	<0.0001
3 mm vs. 4 mm	0.413
Immediate vs. 24 Hours	0.001
Immediate vs. 1 Week	<0.0001
Immediate vs. 1 Month	<0.0001
Immediate vs. 3 Months	<0.0001
24 Hours vs. 1 Week	0.998
24 Hours vs. 1 Month	0.236
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.385
1 Week vs. 3 Months	<0.0001
1 Month vs. 3 Months	0.006

n = 15
Results shaded red are considered significant at a 95% confidence interval

Two-way ANOVA analysis of the ratio (expressed as a percentage) of total weight loss to water gain of the Photac-Fil Quick samples identified significant difference for weight change as a function of storage time ($p < 0.0001$) but not for specimen thickness ($p = 0.342$) without an identified interaction indicated between the two factors ($p < 0.903$). There were significant differences noted between the 24-hour and three-month as well as between the one-week and three-month storage time periods. Results of the *post hoc* testing can be seen in Table 62.

Table 62. Scheffe Multi Comparisons For Photac-Fil Quick Total Weight Loss to Water Gain	
Comparisons	**p value**
2 mm vs. 3 mm	0.366
2 mm vs. 4 mm	0.928
3 mm vs. 4 mm	0.582
24 Hours vs. 1 Week	0.613
24 Hours vs. 1 Month	0.199
24 Hours vs. 3 Months	<0.0001
1 Week vs. 1 Month	0.868
1 Week vs. 3 Months	0.020
1 Month vs. 3 Months	0.129

n = 15
Results shaded red are considered significant at a 95% confidence interval

Analysis of the ratio of the weight loss observed during the DSC thermal scan to water gain of the Photac-Fil Quick samples indicated similar results, with significant differences found with storage time (p = 0.001) but not with sample thickness (p = 0.310). As with the analysis of total weight loss to water gain, a significant interaction between the two factors was not identified (p = 0.927). The highest ratio was noted at the 24-hour storage time, at which point the ratio of scan loss to water gain was observed to decrease with storage time. Scheffe *post hoc* comparison results are presented in Table 63.

Table 63. Scheffe Multi Comparisons Ratio For Photac-Fil Quick DSC Thermal Scan Weight Loss to Water Gain

Comparisons	p value
2 mm vs. 3 mm	0.992
2 mm vs. 4 mm	0.452
3 mm vs. 4 mm	0.382
24 Hours vs. 1 Week	0.976
24 Hours vs. 1 Month	0.607
24 Hours vs. 3 Months	**0.003**
1 Week vs. 1 Month	0.845
1 Week vs. 3 Months	**0.011**
1 Month vs. 3 Months	0.089

n = 15
Results shaded red are considered significant at a 95% confidence interval

CHAPTER FOUR:

DISCUSSION

In terms of setting chemistry, resin-modified glass-ionomer restorative materials are more complex than their conventional predecessors.[3] Although Andrzejewska *et al.*[64] reported that the addition of aqueous polyacids enhanced the light-induced polymerization of HEMA, the converse is not the same, as organic, photopolymerizable monomers alters the conventional acid-base setting reaction.[3] Anstice and Nicholson[65] reported that the addition of HEMA to a conventional restorative glass-ionomer restorative material resulted in a slower setting reaction with reduced compressive strength. The cause of this effect was assumed to be reduction of ionic reactions due to reduction of dielectric constant of HEMA,[65] conformational changes that result in a more tightly coiled thus less-reactive polyacrylic acid polymer,[3] and that the aqueous HEMA solution provides less solubility for the polyacrylic acids to enter solution and react.[65] Conventional clinical wisdom states that depth of cure is not important with resin-modified glass-ionomer restorative materials, since clinicians seem to assume that the conventional acid-base reaction will take place at deeper areas in which light penetration is insufficient to enable the polymerization of HEMA.[3] However, clinicians need to realize that these deeper unpolymerized areas represent an area in which the acid-base reaction is diluted with HEMA. Although some type of setting reaction may take place, it occurs at a much slower pace and results in a material with inferior physical properties.[3,65]

The overall aim of this research was to identify and possibly quantify any post-visible-light irradiation reactions that may occur in resin-modified glass-ionomer restorative materials in depths of two to five millimeters. Three different areas of investigation were undertaken: Solubility, Hardness, and Thermal Analysis.

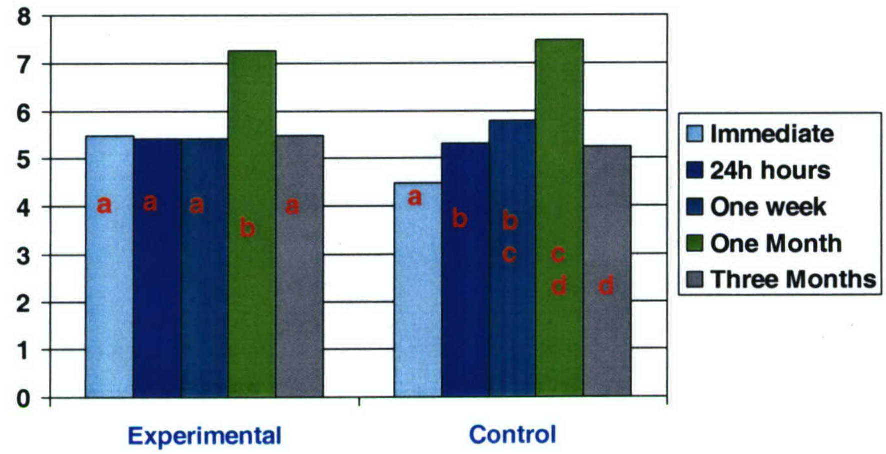
Solubility: The solubility testing method was partly based on ANSI/ADA Specification No. 27: Resin-Based Filling Materials (1997).[60] Accordingly, the method utilized was designed to provide specimens of uniform surface area, thickness, equal exposure duration to moisture, and dehydration of the specimens until weight stability to the nearest 0.001 grams was observed. However, this evaluation differed from either the ANSI/ADA Specification No. 27 and/or clinical

conditions in three ways. The first variation is that in this investigation solubility was solely assessed as a function of percentage weight loss, whereas the ANSI/ADA specification is based on weight loss per calculated volume. This parameter was chosen in an attempt to establish a protocol that would allow expedient comparison of solubility, lessen material loss, as well as sample dehydration during extra handling required of volume measurements. Although the chosen thesis parameter, being based on weight alone, could be criticized for lacking the precision of the ANSI/ADA specification, the parameter was envisioned to allow expedient comparative solubility analysis.

The second variation is that this method involved specimens of different photopolymerization protocols with four different thicknesses per group. The "experimental" group represents a photopolymerization method that mirrors clinical placement; that is, the specimens are light activated as per manufacturer recommendations from the top surface of the specimen cylinder. This thesis "control" group involved both the specimen top and bottom surface photoactivation. Although the control group represents a clinically unrealistic situation, the control samples were designed to allow possible comparison of material solubility behavior and kinetics between the two polymerization schemes.

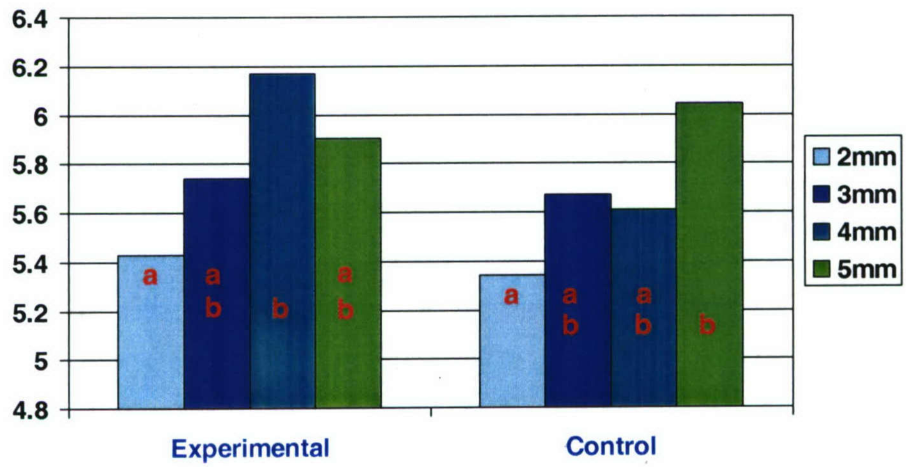
The third area in which this evaluation differed is that a protective varnish or resin coating was not applied to the polymerized samples. Although originally touted to be less susceptible than conventional glass-ionomer materials to the effects of early moisture contamination and later dehydration, resin-modified glass-ionomer restorative materials were found to also require a surface protecting agent.[10,11,66,67] Surface protectants were not applied to the specimens during this investigation as it was felt that the surface coatings could reduce the experiment sensitivity to solubility differences that could exist due to the different curing regimens.

Figure 6. Vitremer Group Solubility per Storage Time (%)



n = 20
Groups marked with the same letter are statistically similar (p > 0.05)

Figure 7. Vitremer Group Solubility per Specimen Thickness (%)

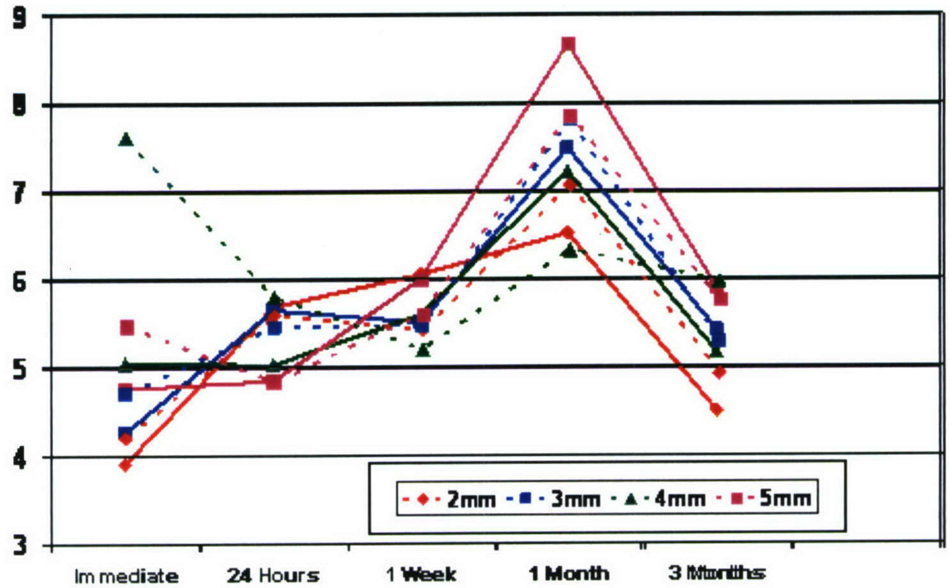


n = 25
Groups marked with the same letter are statistically similar (p > 0.05)

Graphical results for the multivariate analysis of the Vitremer solubility groups as a function of curing mode, and storage time can be seen in Figure 6. The experimental groups exhibited similar solubility at all storage times except for the one month time period. The control groups exhibited increasing solubility with the increase in storage time which appeared to peak at one month and then decrease. The results for multivariate Vitremer solubility for both curing modes as a function of thickness can be seen in Figure 7.

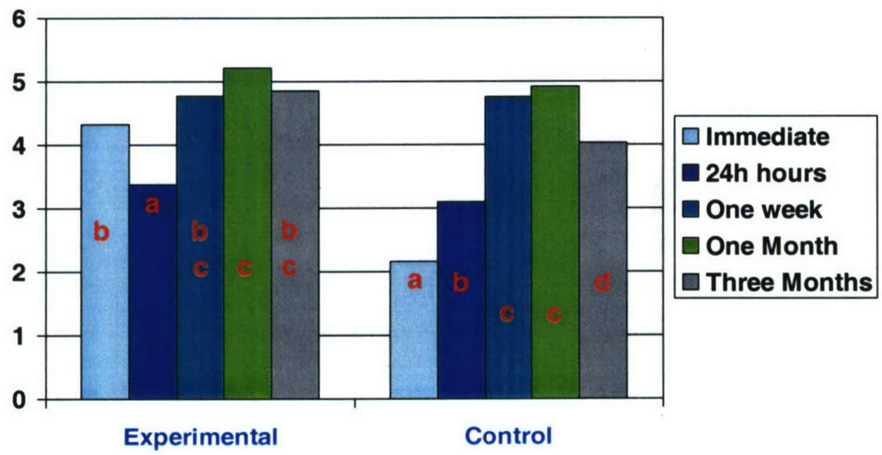
Comparative solubility trends between the two Vitremer groups are compared with the results graphically superimposed in Figure 8. The experimental samples are represented by the dotted lines while the control samples are depicted with the solid lines. It can be readily observed that solubility over time between the two curing modes exhibits a similar trend, as independent of each thickness by curing mode pair only identified four instances of significant difference in solubility.

Figure 8. Overlay of Vitremer Solubility Results (%)



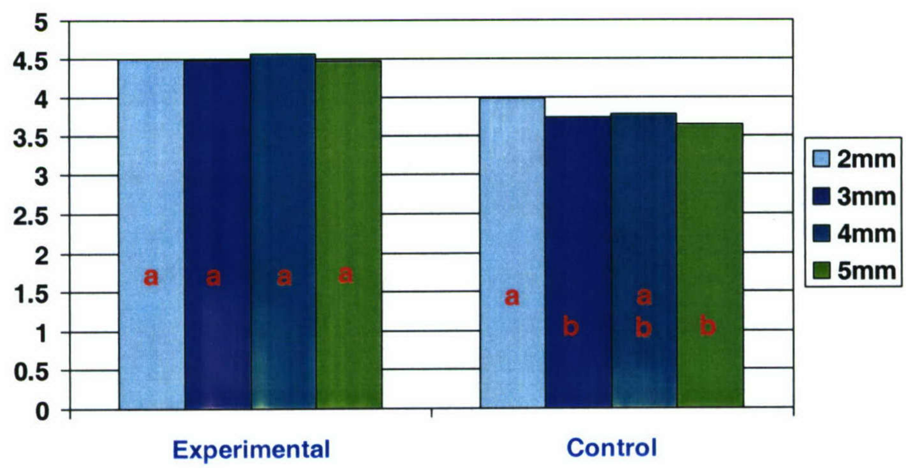
Graphical results for the multivariate analysis of the Fuji II LC solubility groups as a function of curing mode and storage time can be seen in Figure 9. The Fuji II LC experimental groups exhibited statistically less solubility at 24 hours but increased solubility as storage time progressed. The control samples likewise exhibited a significant increase in solubility as storage time progressed, which likewise to the Vitremer samples, appears to peak at one month storage.

Figure 9. Fuji II LC Group Solubility per Storage Time (%)



n = 20
Groups marked with the same letter are statistically similar ($p > 0.05$)

Figure 10. Fuji II LC Group Solubility per Specimen Thickness (%)



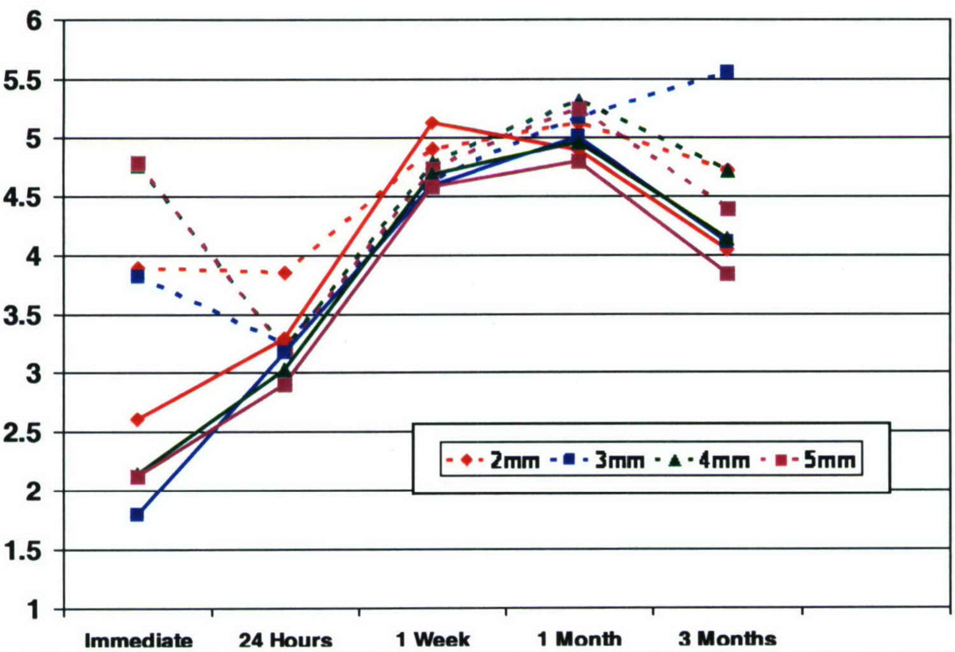
n = 25
Groups marked with the same letter are statistically similar ($p > 0.05$)

Graphical results for the multivariate analysis of the Fuji II LC solubility groups as a function of curing mode and specimen thickness can be seen in Figure 10. Interestingly, the experimental groups exhibited similar solubility regardless of sample thickness while the control groups were observed to demonstrate decreased solubility as the sample increased in thickness.

An overlay of the Fuji II LC control and experimental solubility results is depicted in Figure 11. The experimental results are annotated with dotted lines and the control results are represented

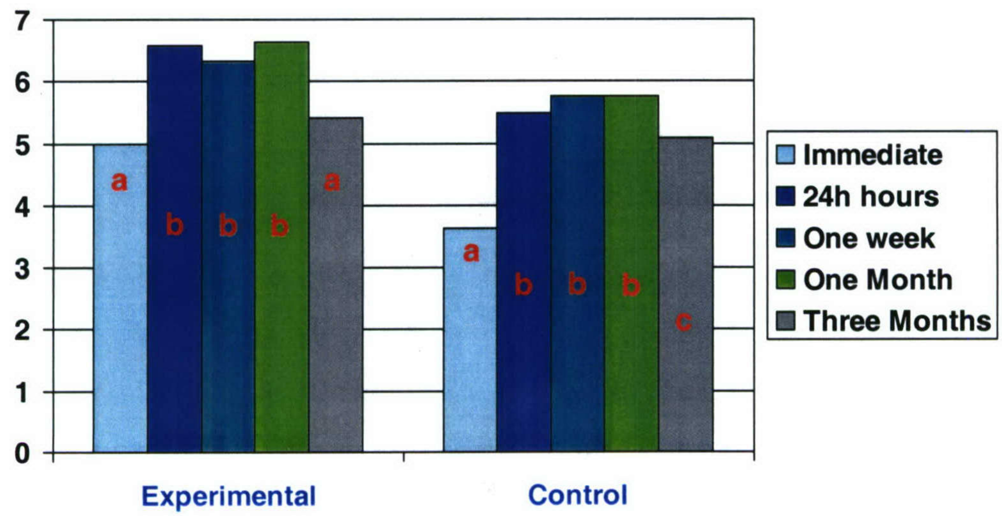
by solid lines. Independent t-test analysis of each curing mode thickness pair at the same storage time identified that the control group for the immediate, three-month, and all but the 3 mm samples of the 24-hour group exhibited significantly less solubility than the experimental samples. Similar to the Vitremer samples, the overall solubility trend of increasing solubility with increased storage time with solubility peaking at one month is evident.

Figure 11. Overlay of Fuji II LC Solubility Results (%)



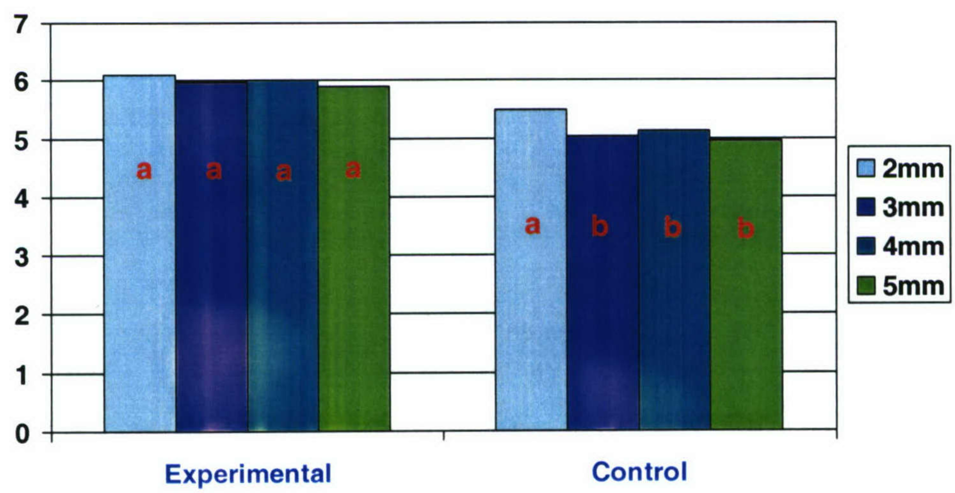
Graphical results for the multivariate analysis of the Photac-Fil Quick solubility groups as a function of curing mode and storage time can be seen in Figure 12. With both curing modes there was a significant increase in solubility with increasing storage time that exhibits a significant decrease after one month of storage. When considered per specimen thickness (Figure 13), the Photac-Fil Quick experimental specimens, similar to that seen of Fuji II LC, do not differ significantly in solubility. Also similar to Fuji II LC, the Photac-Fil Quick control samples exhibit significantly less solubility with increased sample thickness, with the 2 mm specimens displaying significantly more solubility than the other thicknesses.

Figure 12. Photac-Fil Quick Solubility per Storage Time (%)



n = 20
Groups marked with the same letter are statistically similar (p > 0.05)

Figure 13. Photac-Fil Quick Solubility per Specimen Thickness (%)

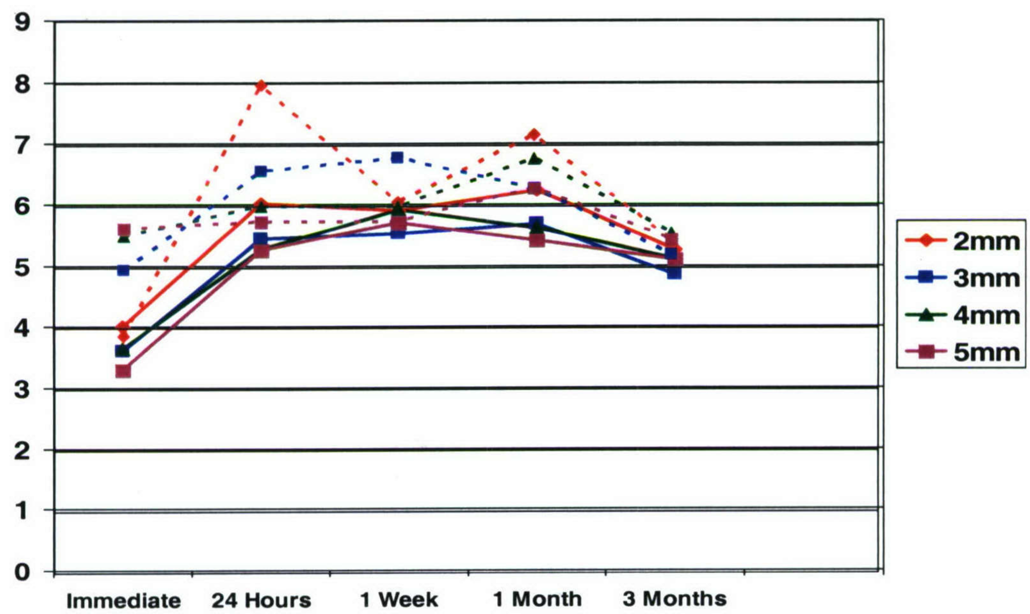


n = 25
Groups marked with the same letter are statistically similar (p > 0.05)

Photac-Fil Quick combined control and experimental solubility results are graphically depicted in Figure 14, with the dashed lines depicting the experimental samples and the solid lines annotating the control samples. Independent t-test analysis of each curing mode thickness pair at the same storage time identified that the control group samples exhibited significantly less

solubility overall than the experimental samples, except for the three-month storage time at which all exhibited similar solubility. Similar to Vitremer and Fuji II LC, the solubility of Photac-Fil Quick exhibits an increasing trend of solubility that decreases after one month of storage.

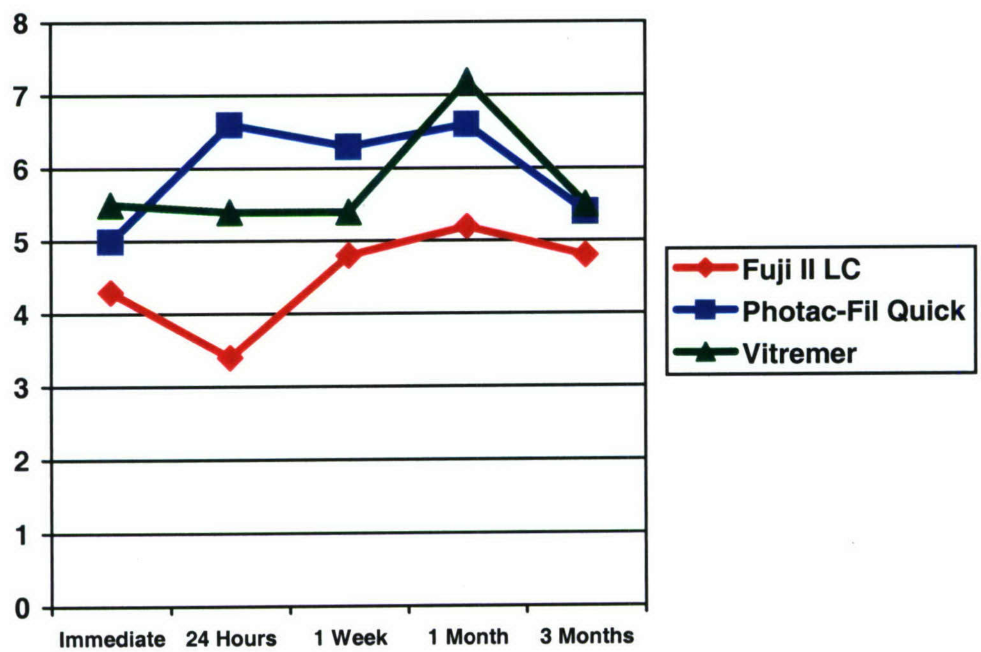
Figure 14. Overlay of Photac-Fil Quick Solubility Results (%)



The marginal means of each material as a function of storage time are depicted in Figure 15. The experimental group is depicted as this curing mode is representative of clinical conditions. It was not the purpose of this thesis to compare the performance of each material: any such contrast is accomplished only to observe overall material trends under similar conditions. All three materials displayed a trend of increasing solubility with increase of storage time that peaked at the one-month storage interval. This solubility behavior was not totally expected, as it could be assumed that solubility would decrease as the RMGI matrix matured with increasing time. Glass-ionomer materials have been reported to exhibit continued matrix maturity with time,[3] and the exact time intervals involved with RMGI maturity have not been fully revealed. Sidhu *et al.*[68] elucidated some information concerning the matrix maturity of RMGI materials,

and found that Fuji II LC, Photac-Fil Quick, and Vitremer did not exhibit matrix maturity at three months, as evidenced by all materials being susceptible to dehydration effects. At six months, Fuji II LC exhibited resistance to dehydration suggesting matrix maturity, and it required 12 months for Vitremer and Photac-Fil Quick to reach the same level.[68] It can be inferred that the decrease in solubility noted at three months for each of these materials is associated with the matrix maturity process; perhaps this solubility behavior provides evidence that the resin-modified glass-ionomer materials are susceptible to the effects of dehydration for up to one month. However, further evaluation is required for further storage time periods before more definitive comparisons should be attempted.

Figure 15. Material Experimental Group Marginal Means Solubility Results as a Function of Storage Time (%)



n = 25

For the three materials, it is interesting to also note that the trend within each material is that the solubility between the different curing methods was not overwhelmingly significantly distinct. The experimental curing method (visible light activation at the top surface) simulates the clinical situation. The control curing method (visible light activation at the top and bottom surfaces) was designed to allow possible comparison of solubility dynamics between the clinical and a more

thoroughly-cured RMGI sample. It was expected that the additional curing of the bottom surfaces afforded to the control samples would effect almost uniformly less-soluble samples, as compared to the experimental group. Review of Tables 1, 2, and 3 will show the t-test results between individual specimens of the same thickness and storage time, and will demonstrate individual instances of non-difference between samples as per curing mode.

The lack of uniform difference between curing modes of the RMGI materials might be explained by the resin content of the RMGI materials. RMGI have been reported to be composed of approximately 4.5 – 6 percent resin in the set product.[10] Although the presence of resin may purportedly improve some physical properties of glass ionomer materials, perhaps the amount of resin present is in insufficient quantity to affect solubility behavior. Accordingly, the solubility behavior of the RMGI materials may be more dictated by the conventional, acid-base components of the hybrid material.

Another unexpected finding under the conditions of this study was the lack of solubility differences between the different depths of samples. Additional one-way ANOVA of the Vitremer samples as a factor of thickness did not find a significant difference in solubility for the experimental samples ($p = 0.141$) as well as the control samples ($p = 0.243$). Analysis of Fuji II LC samples did not identify a significant difference in solubility within the experimental samples ($p = 0.986$) or the control samples ($p = 0.732$). Likewise, analysis of Photac-Fil Quick samples did not find a significant difference among the experimental samples ($p = 0.912$) nor the control specimens ($p = 0.179$). Although experimental conditions were followed as precisely as possible, solubility testing did result in some groups yielding variant standard deviations. However, it is thought that the wide standard deviations observed would not affect the overall results reported in this evaluation.

One explanation that may have resulted in the lack of solubility difference findings of this study could be due to the kinetics of water penetration into the samples. Water diffusion into most

dental materials follows Fick's First Law of Diffusion, which follows that for disc specimens (where edge effects can be ignored) the following equation applies:

$$M_t / M_\infty = 2(Dt/\pi l^2)^{1/2}$$

where

M_t = the mass up take at time t (seconds)

M_∞ = is the equilibrium uptake

l = the thickness of the specimen

D = the diffusion coefficient.[69]

Nicholson[70] reported the water absorption of two resin-modified glass-ionomer restorative materials (Vitremer and Baseline VLC [no longer manufactured]) and found that, based on solution used, the two materials exhibited absorption behavior that followed Fick's First Law for only an initial period of time. Nicholson identified that curing duration effected a dependent action on the diffusion coefficient, in that longer visible light polymerization times had an inverse effect on the diffusion coefficient. Nicholson reasoned that the longer curing duration polymerized more previously-soluble materials into a more insoluble state. Furthermore, an increase in the degree of polymerization would reduce the ease in which water molecules could potentially diffuse through the structure.[70] Although as water diffusion rate into the resin-modified glass-ionomer materials declined with increasing time, Nicholson reported that it still required a total of ten days to reach equilibrium with a 2.8-millimeter thick disc of Vitremer.[70]

Nicholson's work was reinforced by two reports by Jevnikar *et al.*[71,72] using micro-magnetic resonance imaging techniques. In their first report,[71] the authors compared water infiltration into both conventional and resin-modified glass ionomer restorative materials for up to 192 hours and reported that in the first 24 hours water diffused 0.72 mm into the conventional material and 0.33 mm into resin-modified glass ionomer material. The conventional glass-ionomer materials required 96 hours for full water equilibrium, however; the resin-modified glass-ionomer material required 192 hours, which led the authors to conclude that resin-modified glass-ionomer restorative materials are more impervious to water infiltration than their conventional

counterparts.[71] In their second report, Jevnikar *et al.*[72] investigated the effect of surface coatings on water migration into resin-modified glass-ionomer restorative materials using similar techniques as in their previous report and further demonstrated that water diffusion into these materials are limited for the first 24 hours.

This information from Nicholson[70] and Jevnikar *et al.*[71,72] may provide insight pertaining to why a profound expected difference was not observed in solubility between the control and experimental groups during this evaluation. Accordingly, since only a 24-hour water exposure time was used for solubility determination, the water diffusion rate into the respective materials represented only near-surface solubility behaviors. Hence, the solubility results were limited by the rate of water diffusion into the thicker materials and did not represent the solubility behavior of the entire sample. Future solubility evaluations involving resin-modified glass-ionomer restorative materials should include increased water exposure time to equilibrium conditions.

Insight into the behavior of increasing solubility over the first month could be provided by the lower-kinetic reactions that continue with glass-ionomer materials. It has been reported that with conventional glass-ionomer materials both compressive and flexural strengths decline after a few months of water storage.[73,74] Although these changes were first thought to be due to hydrolytic instability,[73,74] it was reported later by Nicholson and Abiden that these changes occurred even with anhydrous storage in oil.[75] It is thought that the observed strength degradation is due to increased material brittleness resulting from the continued slow reactions that lead to higher polymer cross-link density within the glass-ionomer material.[3] These continued reactions in addition could create internal stresses of such magnitude that stress release is afforded by the creation of internal defects that communicate to the surface. Although this remains conjecture, such communications could allow additional increase of surface area exposed to water and result with increased solubility. If the reactions were to cease after a certain period of time, no further stresses would be generated and solubility at that point would either plateau or decline. Decline could be possible if the proposed surface alterations could be healed, as resin-modified glass-ionomer restorative materials have been

reported to self-heal cracks upon exposure to water.[67,76] Nevertheless, the solubility results provides strong evidence that the continuing polyalkenoate reaction can be susceptible to solution effects for up to one month after fabrication.

Microhardness

The use of hardness to observe the setting and curing behavior of resin-modified glass-ionomer materials has been investigated,[59,76-83] as the change in hardness may reflect a material's state of cure and possibly demonstrate the continuation of a setting reaction.[81] Xie *et al.*[82] evaluated the physical properties of glass-ionomer materials that included Knoop hardness after seven days storage and found that as a whole, the resin-modified glass-ionomer materials exhibited lower Knoop hardness numbers than the conventional materials.

Swift *et al.*[59] reported the depth of cure of different resin-modified glass ionomer materials using Knoop Hardness for up to seven days. These researchers evaluated the depth of cure of Fuji II LC, Photac-Fil, Vitremer, and two compomers (Geristore and Variglass) for seven days with each material evaluated in depths up to nine millimeters. Reported results stated that all materials could only be analyzed at depths five millimeters and less, as depths greater than five millimeters were too soft to obtain KHN readings. All of the resin-modified glass-ionomer materials (except Photac-Fil) exhibited an increase in hardness at all depths over the seven-day storage time. Interestingly, at the end of seven days Fuji II LC was reported to have a higher KHN at the 5 mm depth than the top surface, as with Vitremer when evaluated at one day.[59] Their results contrasted with the findings of this thesis, that the bottom hardness did not achieve the same KHN of that seen of the top surfaces. Although they reported that all of the resin-modified glass-ionomer products exhibited satisfactory depth of cure at five millimeters, it was still recommended that these products be placed in thicknesses of three millimeters or less.[59]

Yap[78] compared Vickers hardness of different glass-ionomer, composite, and compomer restorative materials for up to six months. In this report, Fuji II LC and Photac-Fil demonstrated

significantly greater hardness at 24 hours than at six months, which was contrasted by Vitremer that initially demonstrated lower hardness but demonstrated increasing hardness with storage time and was comparable in hardness to Fuji II LC and Photac-Fil at the six-month evaluation period.[78] The findings of this thesis found similar results with Vitremer whose top-surface KHN increased over a period of time, but this study contrasted in that Photac-Fil Quick top-surface KHN was demonstrated to increase to a maximum hardness at one month. Fuji II LC top-surface hardness was found to maintain a steady value over the evaluation period.

Gladys *et al.*[76] reported Vickers hardness determinations of Fuji II LC (both encapsulated and hand mixed), Vitremer, and Photac-Fil as the part of an extensive evaluation of restorative material physical property determinations. These investigators reported that the Vickers hardness of the three materials were somewhat similar, with Fuji II LC exhibiting slightly more hardness values than Vitremer, which in turn demonstrated slightly more hardness values than Photac-Fil.[76] In this thesis study, Vitremer was found to exhibit mean top-surface KHN values slightly more than Fuji II LC, which in turn demonstrated higher values than Photac-Fil Quick.

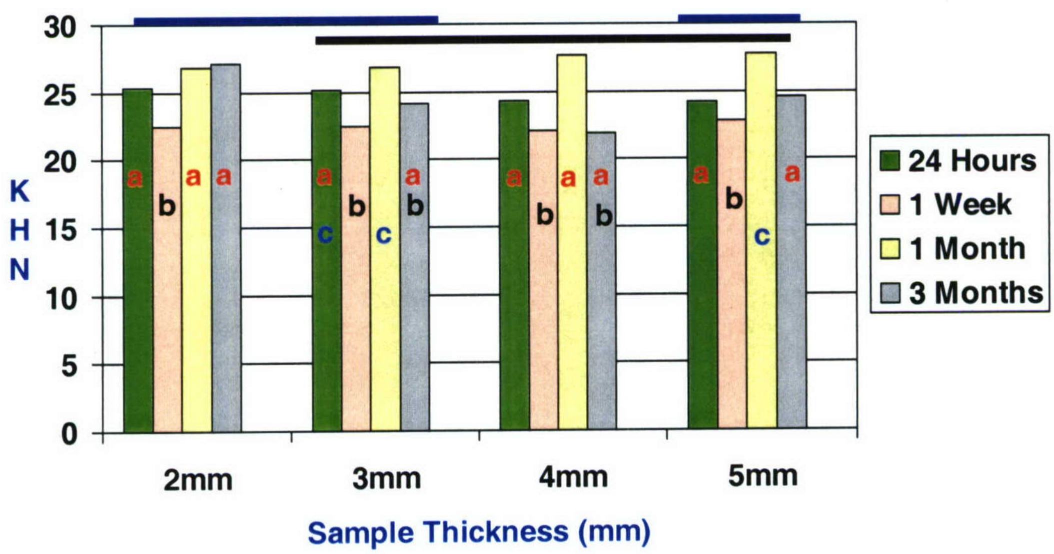
Ellakura *et al.*[79] compared the surface microhardness of resin-modified and conventional glass-ionomer materials as a function of time and water exposure. These researchers followed Vickers microhardness at 1, 7, 15, 30, 90, 180, and 365 days of Fuji II LC, Photac-Fil, and Vitremer as well as Ketac-Fil, Ketac-Molar, and Ketac-Silver. Results found that the resin-modified materials all demonstrated significantly lower microhardness than some of the conventional glass-ionomer materials (Ketac-Fil and Ketac-Molar).[79] Among the resin-modified materials, all materials demonstrated lower hardness at the 24-hour time period but then demonstrated thereafter an increase in hardness. However, Photac-Fil hardness peaked at 15 days while the hardness of Vitremer and Fuji II LC peaked at 60 days. After this time period, the surface hardness of the materials decreased in various amounts up to one year.[79] Results of this thesis corroborated with their results in that most of the RMGI materials demonstrated an

increase in top-surfaced KHN but differed in that materials demonstrated (except Fuji II LC) maximum hardness at three months.

Kanchanavasita *et al.*[83] evaluated the surface hardness of two restorative (Fuji II LC and Vitremer) and two liner resin-modified glass-ionomer materials for up to one year with samples stored both in distilled water and artificial saliva. In this report, both of the restorative materials stored in distilled water reached maximum hardness at 24 hours, and it was reported that the hardness of Fuji II LC and Vitremer were statistically similar. The restorative materials maintained their surface hardness for the duration of the evaluation. It is interesting to note that storage in artificial saliva had a detrimental affect on the maintenance of surface hardness for all of the materials evaluated.[83] As with the study by Ellakura *et al.*,[79] results of this thesis differed in that the materials evaluated reached a maximum KHN value at a later period in time.

The top surface hardness of the Vitremer samples over the storage periods are depicted

Figure 16. Vitremer Top Surface Mean KHN

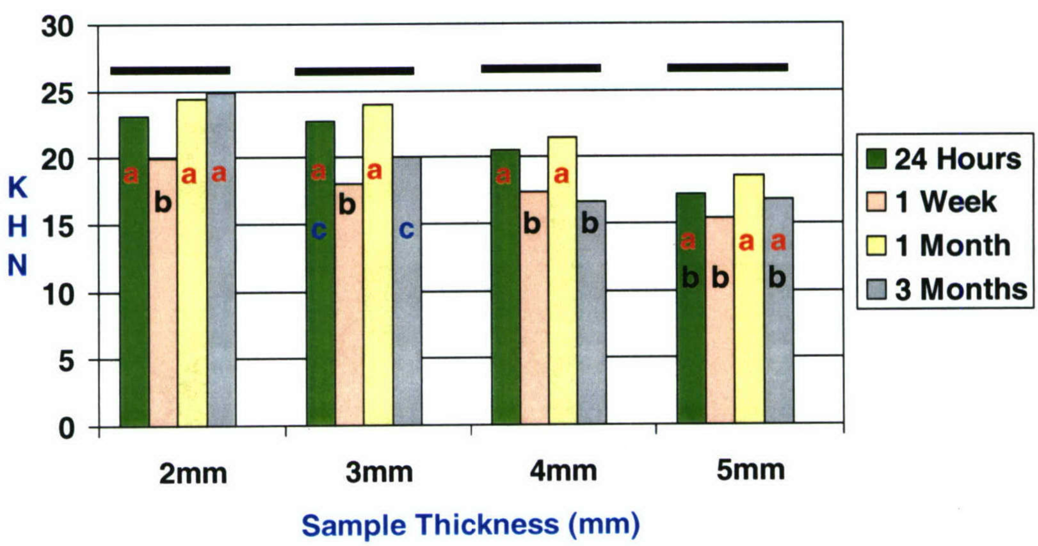


n = 5
Letters connect groups within same thickness that are statistically similar ($p > 0.05$)
Bars connect thicknesses that are statistically similar ($p > 0.05$)

graphically in Figure 16. Within each thickness, the top surface KHN of the Vitremer samples underwent a significant decrease in KHN at one week, which was followed by a significant

increase in hardness at the one-month storage period. At three months, the top surfaces of all of the specimens were similar in hardness to that seen at 24 hours. Analysis of the Vitremer bottom surface KHN over the storage time periods are depicted in Figure 17. Similar to the top surface, the bottom surfaces of all the thicknesses demonstrated a significant decrease in hardness at one week, but all then demonstrated an increase in hardness at one month that was similar to 24 hours. All thicknesses except the 4 mm group exhibited bottom surface hardness at the three-month storage period that was statistically similar to that seen at 24 hours. All of the thickness groups demonstrated significant differences in hardness, with the 2 mm group demonstrating the highest KHN that progressively decreased to the 5 mm group, which had the lowest mean KHN.

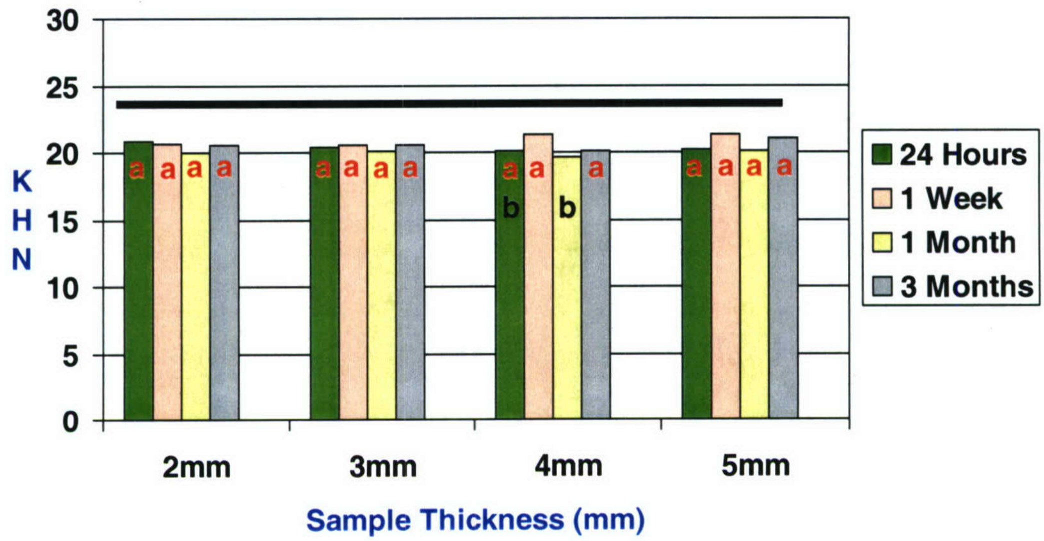
Figure 17. Vitremer Bottom Surface KHN



n = 5
Letters connect groups within same thickness that are statistically similar (p > 0.05)
Bars connect thicknesses that are statistically similar (p > 0.05)

The Fuji II LC top surface mean KHN segregated by sample thickness are depicted in Figure 18. The top surfaced displayed overall stability in hardness over the storage period, except for the 4 mm samples which demonstrated a significant decrease in hardness at one month. However, recovery of hardness was noted at three months. There was no difference in top surface KHN found between the different thicknesses over the storage time.

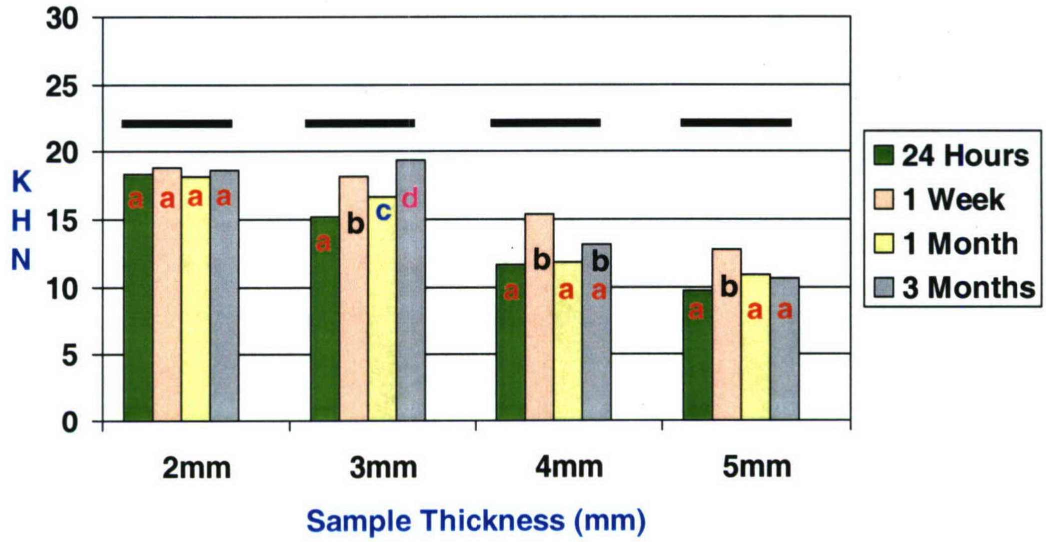
Figure 18. Fuji II LC Top Surface Mean KHN



n = 5
Letters connect groups within same thickness that are statistically similar (p > 0.05)
Bars connect thicknesses that are statistically similar (p > 0.05)

Similar analysis of the Fuji II LC bottom surface hardness by thickness can be observed in Figure 19. The bottom surfaces of the 2 mm samples remain stable, whereas the 3 mm samples undergo a significant increase in hardness at each observation period throughout the storage period. The 4 mm samples display a significant increase in hardness at the one-week time, but the hardness decreases significantly at one-month and then regains hardness to the one-week level at three months. The 5 mm samples also demonstrate a significant hardness increase at one week, but then decreases to the initial 24-hour level. Two-way ANOVA identified that all of the thicknesses demonstrated significant difference in hardness; as the thickness increased the magnitude of the bottom surface hardness decreased.

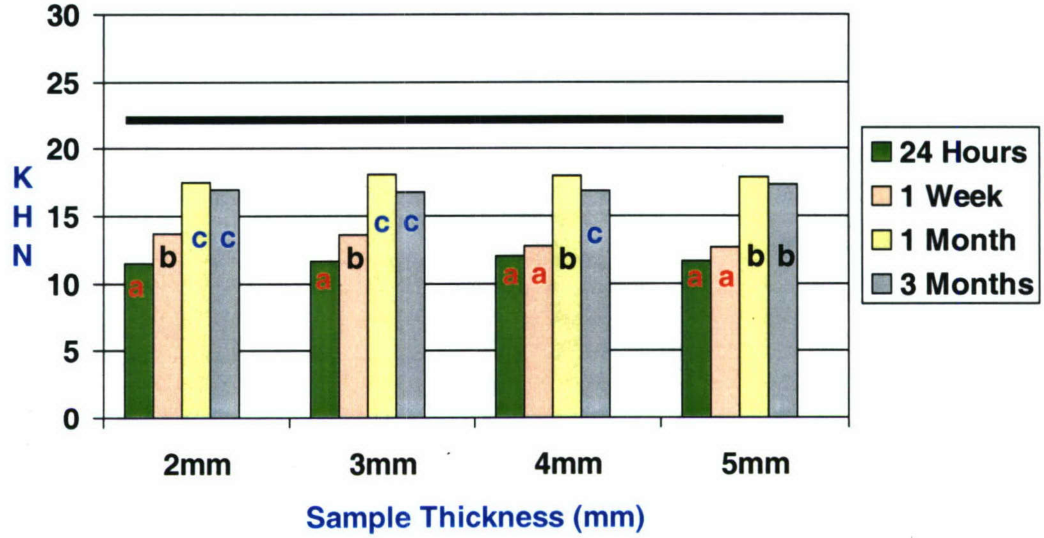
Figure 19. Fuji II LC Bottom Surface Mean KHN



n = 5
Letters connect groups within same thickness that are statistically similar (p > 0.05)
Bars connect thicknesses that are statistically similar (p > 0.05)

The Photac-Fil Quick top surface mean KHN are depicted in Figure 20. All of the top surfaces demonstrated progressive significant increases in KHN throughout the storage period, most notably between the 24-hour, one-week, and one-month storage periods for the 2 mm and 3 mm thicknesses; between one-week, one-month, and three-months storage for the 4 mm samples; and between the one-week and one-month storage for the 5 mm samples. Two-way ANOVA did not find a significant difference between the mean hardness of any of the top surfaces over the three-month storage period (p = 0.825)

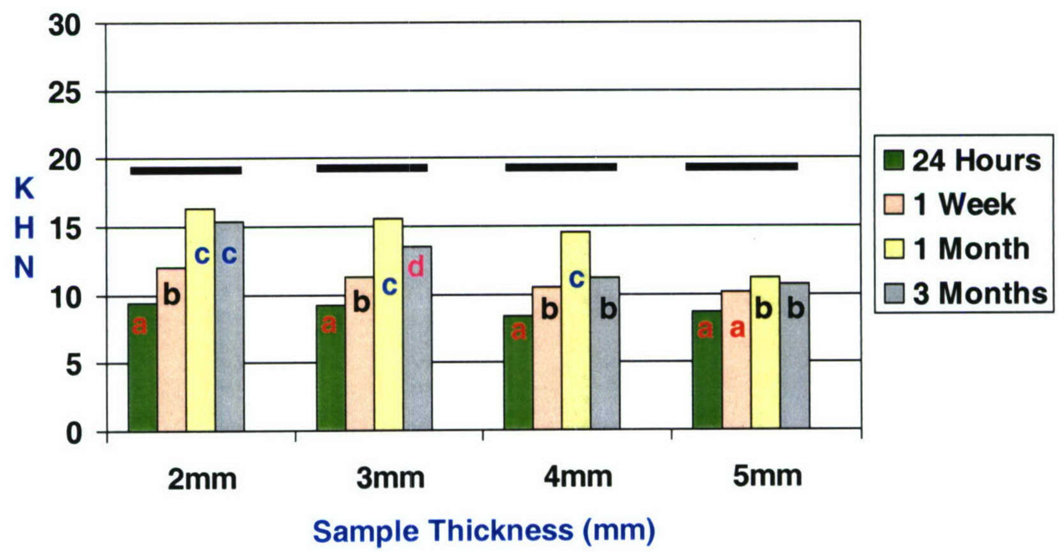
Figure 20. Photac-Fil Quick Top Surface Mean KHN



n = 5
Letters connect groups within same thickness that are statistically similar (p > 0.05)
Bars connect thicknesses that are statistically similar (p > 0.05)

The Photac-Fil Quick bottom surface mean KHN segregated by sample thickness are depicted in Figure 21.

Figure 21. Photac-Fil Quick Bottom Surface Mean KHN



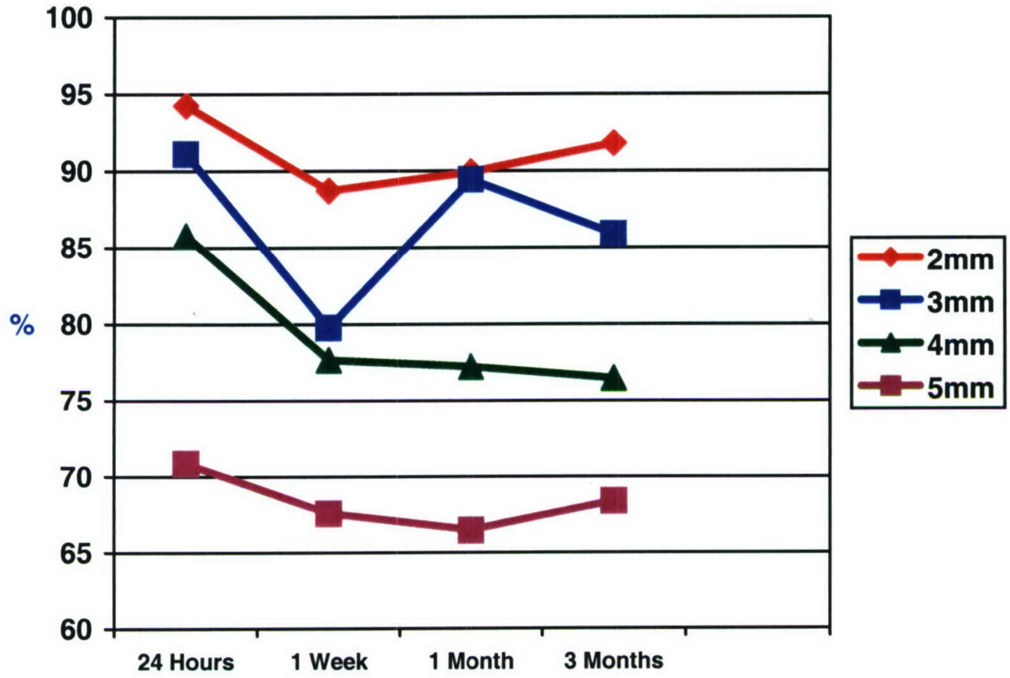
n = 5
Letters connect groups within same thickness that are statistically similar (p > 0.05)
Bars connect thicknesses that are statistically similar (p > 0.05)

Almost mirroring the KHN results of the top surface, all of the bottom surfaces of the various thicknesses exhibit progressive and significant increase in hardness up to one-month point and then demonstrate a hardness decrease, though not always significant. Furthermore, two-way ANOVA found significant differences between the thicknesses, with KHN decreasing as the thickness increased.

The use of surface hardness in the determination of composite resin restorative material depth of cure has largely utilized Knoop hardness, which has been reported to correlate well with methacrylate degree of conversion determined with FTIR as well as other material physical properties.[84,85] Furthermore, the comparison of the top- and bottom surface Knoop hardness ratios have been used as a method for the determination of adequate visible-light-curing resin polymerization, with a bottom/top ratio of at least 0.80 suggesting an adequate cure.[86-88] Prior published research has not explored the use of a similar ratio suggesting adequacy of cure with resin-modified glass-ionomer materials. Analysis of the KHN bottom/top ratios of the resin-modified glass-ionomer materials was investigated to identify any possible trends that could be associated with these materials.

Vitremer samples of all thicknesses demonstrated a diminishing trend of the bottom/top ratio (Figure 22) from 24 hours to one week after which the 2 mm and 3 mm samples experienced some increase of the ratio, nearly coinciding at one month. The 2 mm samples did not experience a significant change ($p = 0.195$) during the storage period whereas the 3 mm group demonstrated a significant loss ($p < 0.0001$) at one week but regained at one month to be significantly similar to the 2 mm samples ($p = 0.829$). The 4 mm and 5 mm samples, although displaying a decrease in the bottom/top ratio, did not experience a significant loss ($p = 0.206$, 0.500, respectively). At the end of the three-month storage period, none of the KHN bottom/top ratios were statistically similar ($p < 0.0001$).

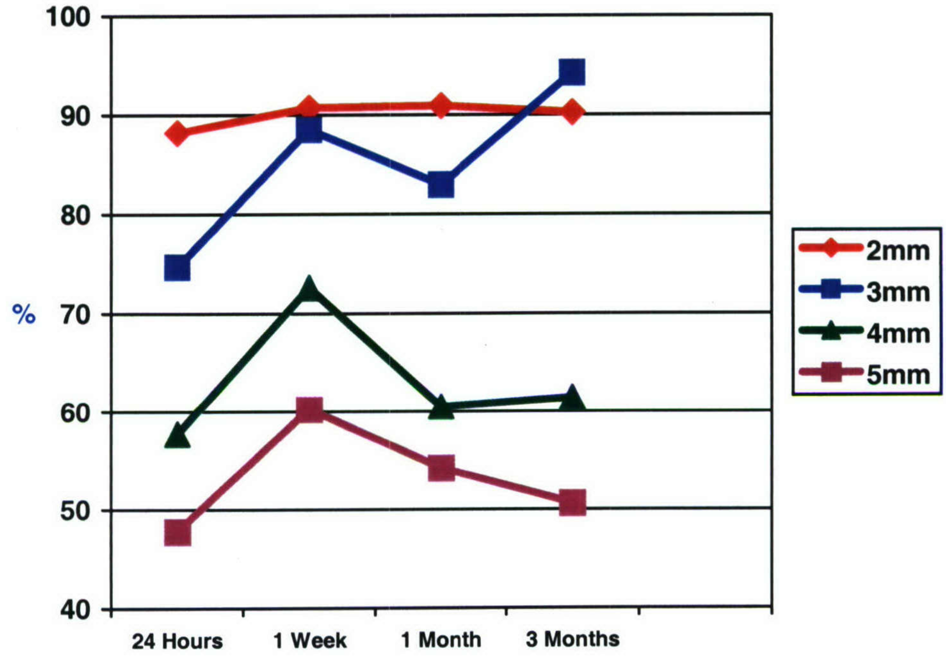
Figure 22. Vitremer Mean Bottom/Top KHN Ratios Over Storage Time (%)



n = 5

Graphical depiction of the Fuji II LC bottom/top KHN ratio over time per thickness and storage time can be observed in Figure 23. The 2 mm samples displayed a stable ratio throughout the storage period, whereas the 3 mm samples displayed significant increases of the KHN ratio throughout the observation time ($p < 0.0001$). The 3 mm samples at one week displayed a mean KHN ratio that was statistically similar to the 2 mm samples ($p = 0.357$). Furthermore, the three-month KHN ratio for the 3 mm samples interestingly also increased to the level that was statistically similar ($p = 0.233$) to that of the 2 mm samples. The 4 mm samples demonstrated a significant increase at one week ($p = 0.002$) that was followed by an insignificant decline at one and three months. The 5 mm samples similarly demonstrated a significant KHN ratio increase at one week ($p = 0.002$) that was also followed by a diminishing of the ratio that was found to be similar to the ratio that presented at 24 hours.

Figure 23. Fuji II LC Mean Bottom/Top KHN Ratios Over Storage Time (%)

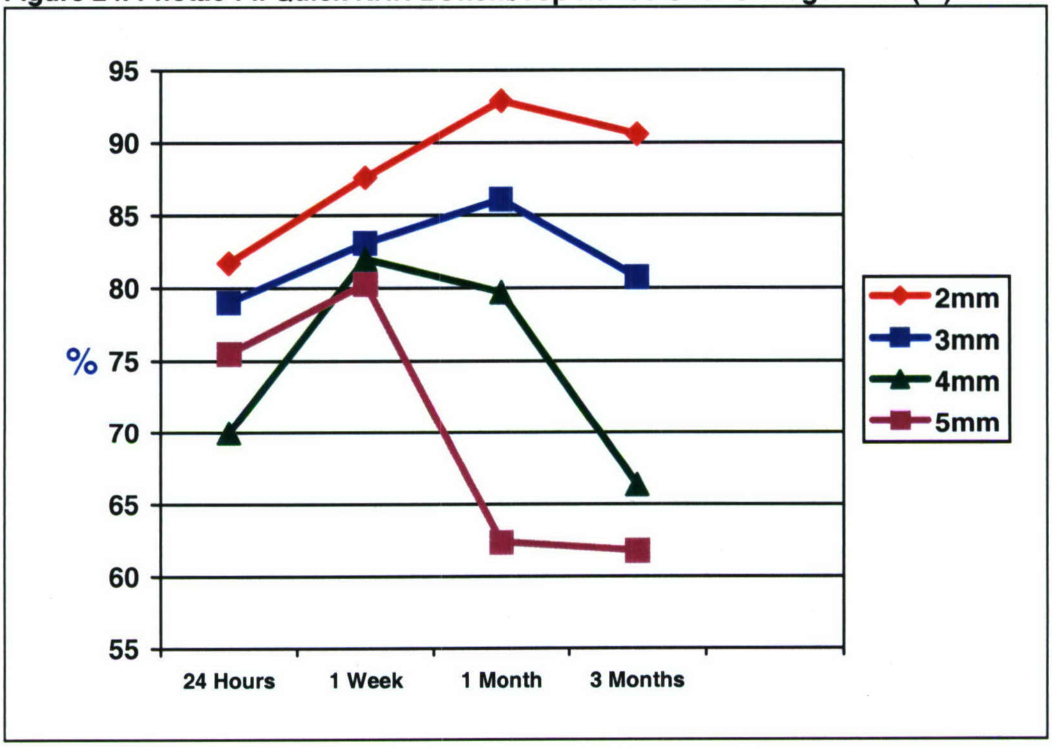


n =5

At the end of the three-month storage period the 2 mm and 3 mm samples had similar KHN bottom/top ratios but were statistically greater than the 4 mm and 5 mm samples ($p < 0.0001$).

The Photac-Fil Quick bottom/top KHN ratios are presented in Figure 24. Interestingly, the ratio of the 2 mm and 3 mm samples are statistically similar ($p = 0.304$) which is maintained until one month. All the thicknesses demonstrate a trend for increase in the KHN ratio at one week, after which the 2 mm and 3 mm samples continue to increase until the one month time period. The 4 mm samples decline after one week whereas the 5 mm samples demonstrate a significant decline ($p = 0.021$) in the KHN ratio after one week. At one month and at three months, the 4 mm and 5 mm samples continue on a downward trend. At the end of the three-month period, the Photac-Fil Quick different thicknesses, similar to Vitremer, are not statistically similar ($p < 0.0001$).

Figure 24. Photac-Fil Quick KHN Bottom/Top Ratios Over Storage Time (%)



n = 5

The results of this study corroborate the findings of earlier studies. Similar to Yap,[78] Ellakuria *et al.,*[79] and Kanchanavasita *et al.*[83] the RMGI materials used in this evaluation demonstrated a variation in top surface KHN with storage time. However, where this study mainly differs from the previous studies is the time in which the KHN variation occurs. Yap reported that Fuji II LC and Photac-Fil Quick demonstrated the highest top-surface Vickers hardness at 24 hours while Vitremer had significantly higher hardness at 6 months.[78] Ellakuria *et al.* reported that Photac-Fil Quick demonstrated its maximum hardness at 15 days whereas Fuji II LC and Vitremer increased in hardness to maximum levels at two months.[79] Kanchanavasita *et al.* reported that Fuji II LC, Photac-Fil Quick, and Vitremer all exhibited maximum hardness at 24 hours.[83] In contrast to these reports, the findings of this study did demonstrate an increase in top KHN numbers, but the maximum hardness for both Vitremer and Photac-Fil Quick were observed to occur at one month. Also, contrary to earlier reports, Fuji II LC did not demonstrate a significant change in top surface KHN over the evaluation period, although an increasing trend was noted to occur at one week for some thicknesses. It should be noticed that all earlier studies involving

hardness of RMGI materials mainly involved analysis of development of just top-surface hardness. Only this report and the study published by Swift *et al.*[59] involved analysis of RMGI bottom surface hardness.

The overall results of the hardness testing of the resin-modified glass-ionomer restorative materials provide some evidence of a continuing setting reaction and reinforces the concept that the addition of resin does not totally inhibit the potential for the polyalkenoate reaction to continue. Young [25] reported in a FTIR study of one-millimeter-thick, resin-modified glass-ionomer products that approximately 97 percent of the methacrylate reaction was complete after 150 seconds. Accordingly, this FTIR study provides emphasis that any continuing setting reactions in the upper regions of RMGI materials after this time are predominately the acid-base polyalkenoate setting reaction. The deeper regions are similarly assumed to predominately possess the polyalkenoate acid-base reaction, as all materials were observed to demonstrate an increase in bottom-surface hardness in varying degrees over the course of this study.

Both Vitremer and Photac-Fil Quick demonstrated a peak in bottom-surface KHN at one month, whereas Fuji II LC bottom-surface KHN appeared to be at its maximum (except for the 3 mm bottom surface) at one week. Thereafter, the bottom surface KHN of all the materials demonstrated a decrease; however the hardness was not observed to fall (except for the Vitremer 4 mm samples) significantly below the hardness exhibited at 24 hours. These findings do reinforce the concept that a lower-kinetic reaction does take place in the deeper regions of the resin-modified glass-ionomer materials. However, the decrease in hardness values after a certain time indicates, especially in the 4 mm and 5 mm samples, that the process reaches an endpoint.

Whereas the Vitremer and Fuji II LC top surface KHN remained stable, the top surface KHN of the Photac-Fil Quick samples demonstrated an increase of hardness with time that approximately mirrored the development of KHN in the bottom surfaces. The development of

hardness in the top surface of the 2 mm Photac specimens displayed significant correlations ($\alpha = 0.01$) with the development of hardness in the bottom surfaces of the 3 mm (Pearson's 0.945, $p < 0.0001$), 4 mm samples (Pearson's 0.816, $p < 0.0001$) and 5 mm samples (Pearson's 0.686, $p = 0.001$). These correlations provide evidence that the setting reaction that enables the hardness development is possibly similar, as the bottom and top hardness of the Photac-Fil Quick samples appears to be developed by the same kinetics.

In spite of these signs of continued reactions, none of the materials developed a bottom surface KHN in the thicker samples (4 mm and 5 mm) that approximated the hardness observed in the 2 mm thick samples. This is made most evident in the examination of the KHN bottom/top ratios over the storage periods. Except for Vitremer, the ratios do reflect initial signs of a continued setting reaction in the 4 mm and 5 mm samples, but the trend is reversed at one week for both Fuji II LC and Photac-Fil Quick.

Using the ratio of the bottom KHN to the top KHN of the materials allows some interpretation of the overall effect of the development of KHN of the resin-modified glass-ionomer materials. As this ratio has been utilized extensively in the study of resin composites,[84-88] it has not been reported previously involving resin-modified glass-ionomer materials. Fuji II LC and Vitremer presented stable KHN ratios for the 2 mm samples over the storage time whereas Photac-Fil Quick demonstrated a progressive improvement in KHN ratio as time progressed up to the one-month storage period, after which a decrease was observed. The Photac-Fil Quick 3 mm KHN ratio mirrored the increase in KHN ratio of the 2 mm samples, although the values were significantly less. For Vitremer and Fuji II LC, the 3 mm KHN ratios overall increase with time, reaching statistical equivalence to the 2 mm groups briefly at one month for Vitremer and at one week and 3 months for Fuji II LC.

Both Photac-Fil Quick and Fuji II LC display the same trends in KHN bottom/top surface ratios of the 4 mm and 5 mm samples, demonstrating an increase in mean KHN ratios up to one week

of storage which drops afterwards. This similarity in hardness ratio behavior may suggest that these may be similar in composition and post-VLC setting reaction behavior in the deeper regions of the materials.

The results of KHN ratio with the Vitremer samples were somewhat surprising in nature. Vitremer is said to possess, in addition to a VLC and acid-base cures, a "dark cure" that is propagated by a reduction-oxidation reaction.[59] Although some have classified this as a "tricure" curing mechanism, some authors[59] take exception to this nomenclature, stating that the setting mechanism obtained by this method is the same obtained with photoactivation in which polymerization is initiated with a different method. Nevertheless, in deeper regions of Vitremer where light activation is insufficient to enable photoactivation, the combination of the additional "dark cure" and the acid-base polyalkenoate reaction would be expected to result in a hardness increase with longer storage time. Although an increase in hardness was observed in the bottom surfaces of the 4 mm and 5 mm Vitremer samples, the hardness that developed was not of sufficient magnitude to positively affect the KHN ratio. Accordingly, the ratio decreased from 24 hours to one week and remained relatively stable after that point.

Correlation analysis of Vitremer KHN ratios and solubility results did not find a correlation between KHN ratios and experimental solubility ($p = 0.505$). Correlation analysis between Fuji II LC experimental solubility results and KHN ratio results identified a correlation (Pearson's 0.318, $p = 0.004$) as well as with Photac-Fil Quick (Pearson's 0.245, $p = 0.028$). Although some correlations were reported using this set of data between the development of KHN ratios and experimental solubility, it should be remembered that the Pearson's correlation is considered to be liberal, tending to overestimate the true reliability between the data.[89] This is reinforced by that linear regression identified no strong reliability between sets of variables for both Fuji II LC and Photac-Fil Quick ($R^2 = 0.101$, 0.06, respectively).

The KHN ratio for the 4 mm and 5 mm thicknesses in all materials evaluated were observed to demonstrate a decreasing trend with an increase in storage time. This decrease was noted between 24 hours and one week for Vitremer, and the decreasing trend initiated after one week for Fuji II LC and Photac-Fil Quick. One explanation into this decreasing trend could possibly be afforded due to interruption of any potential continuing reactions due to water infiltration. Resin-modified glass-ionomer materials have been demonstrated to absorb water by both Fickian linear and non-linear diffusion behavior that required longer periods of time to reach equilibrium than conventional glass-ionomer materials.[70-72] It has been reported that RMGI materials of two to three millimeters thickness required up to eight[71] to ten days[70] for water infiltration to reach full equilibrium, and the decrease in KHN at or about this same time for the RMGI materials observed in this study could be due to water infiltration that dissolves and/or plasticizes either unreacted components or any matrix that may have formed.

In spite of evidence of a continuing setting reaction within the deeper regions of the resin-modified glass-ionomer materials, there is ample evidence to suggest that any reaction that may proceed in thicknesses greater than 3 mm is insufficient to make up for the amount of cure observed in 2 mm thicknesses. Using the KHN ratio as a guide, only the 3 mm Fuji II LC samples evidenced equivalence to the 2 mm samples at three months, and although Vitremer 3 mm KHN ratio samples were statistically similar to the 2 mm group at one month, the ratio was observed to decrease thereafter. It is only speculative at this time to assume that the KHN bottom/top ratio is a valid method in the analysis of resin-modified glass-ionomer depth of cure, and further research is needed in this area.

Thermal Analysis

The process of measuring the amount of heat involved in a chemical or physical change is known as calorimetry.[90] Using calorimetry the resin-modified glass-ionomer materials were analyzed as per specific heat capacity, thermal scan enthalpy, thermal scan temperature peak, and weight changes during calorimetry.

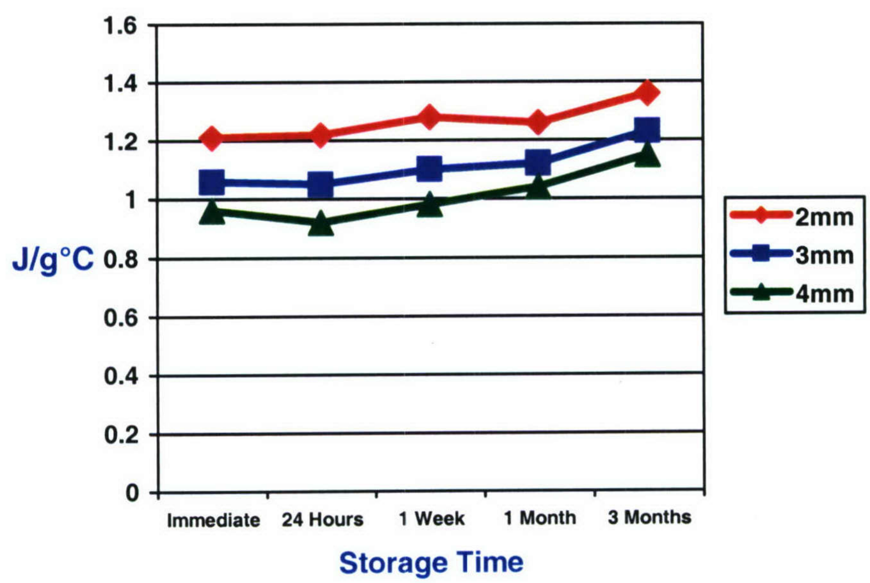
Specific Heat

The specific heat capacity of a material (often referred to as the "specific heat", or "heat capacity") is a measure of the amount of energy required to raise the temperature of one gram (or one mole) of the material by one degree Kelvin.[90,91] The specific heat of a given quantity of matter generally describes a property of the entire quantity of the substance.[90] The specific heat capacity of a substance can be measured from the sample mass and the difference in the heat flow rates determined during a programmed temperature sequence consisting of an isothermal period, followed by a rise in temperature, and then finally another isothermal period. Frequently this is also performed using a standard reference material for calibration.[92] Using a DSC there are usually four methods of specific heat capacity determination: Direct method, Steady State, Sapphire Method, and Alternating DSC (ADSC).[91] The Direct Method is based on the dynamic method of specific heat and is calculated by dividing the heat flow by the heating rate and sample mass. The Direct Method can be accurate to within ± 5% and requires the shortest measurement time.[91] The Steady State is similar in computation as the Direct Method but subjects the sample to a periodic heating and cooling cycle and has an accuracy rate similar to the Direct Method.[91] The ADSC method varies the temperature sinusoidally as a function of time which is superimposed on the average heating rate. The ADSC method is slightly more accurate than the Direct and Steady State, but requires long measurement times. The most accurate specific heat capacity determination, known as the sapphire method, calibrates the thermal signals of a substance against a three-sapphire-disc calibration standard.[91] Due to software limitations with the DSC unit available for this research, the Direct Method for specific heat capacity was used during this evaluation.

The specific heat determinations for this evaluation followed a similar protocol reported by Khalil and Atkins.[61] These investigators scanned a weighed sample of glass-ionomer product between 20 °C and 60 °C at a rate of 10 °C per minute and reported the observed specific heat at 37 °C. The evaluation in this thesis followed a similar protocol but recorded the specific heat as the mean of specific heat determination values at 5 °C intervals above the latent period over the thermal scan. As the specific heat capacity of a material is also dependent on the temperature recorded[90,92] it was felt that a mean of these values over a small thermal range would be representative. Under their protocol, Khalil and Atkins reported the specific heat capacity of Fuji II LC light cured to be 0.972 J/g°C and cured under dark conditions to be 1.267 J/g°C.[61] The results for the Fuji II LC immediate samples under the present evaluation were found to be very similar to that reported by Khalil and Atkins.

The results of specific heat analysis of the Vitremer samples can be seen in Figure 25.

Figure 25. Vitremer Mean Specific Heat Results (J/gºC)



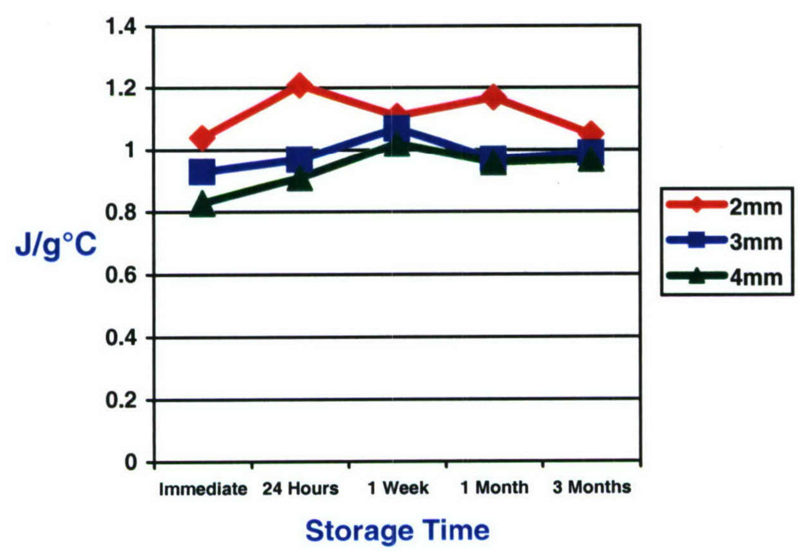
n = 5

All Vitremer samples were observed to increase significantly in specific heat as time progressed. At the end of three-months, there was no significant difference in specific heat

between the 2 mm and 3 mm samples ($p = 0.100$) and between the 3 mm and 4 mm samples ($p = 0.323$). However, there was a significant difference found between the 2 mm and 4 mm samples ($p = 0.007$).

The specific heat results for Fuji II LC can be seen in Figure 26. Similar to that seen of Vitremer, the Fuji II LC samples demonstrated an overall increase in specific heat with storage time. At one week storage, there were significant differences found between the 2 mm and the other thicknesses ($p < 0.005$) but not between the 3 mm and the 4 mm samples ($p = 0.182$). This relationship continued until at three months, where there were no significant differences found between any of the thicknesses ($p = 0.451$).

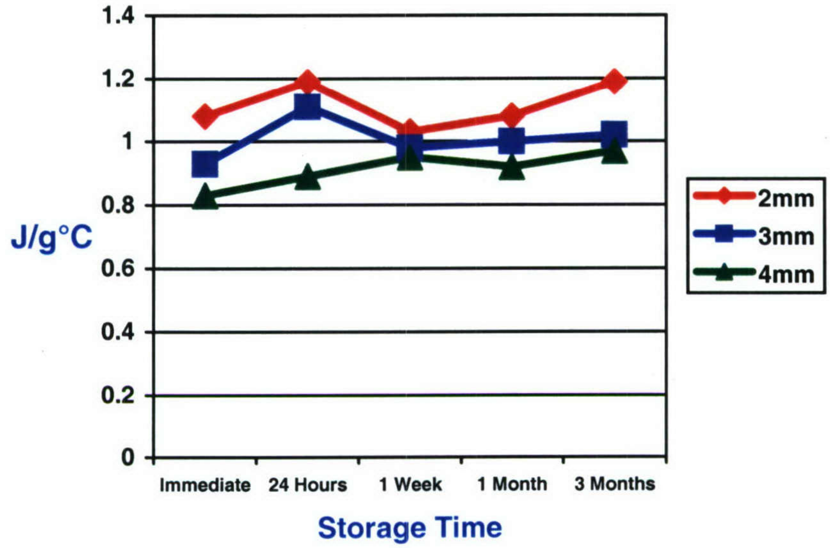
Figure 26. Fuji II LC Mean Specific Heat Results (J/gºC)



n = 5

The results of the Photac-Fil Quick specific heat can be seen in Figure 27.

Figure 27. Photac-Fil Quick Mean Specific Heat Results (J/gºC)



n = 5

As with the other two materials, Photac-Fil Quick demonstrated a generalized increase in specific heat over the storage time. At 24 hours, there was no difference noted between the 2 mm and 3 mm samples ($p = 0.08$) with differences noted between the 3 mm and 4 mm thicknesses ($p < 0.001$), while at one week specific heat values were not significantly different ($p = 0.056$). With passage of time the Photac-Fil Quick 2 mm samples increased in specific heat to demonstrate a significant difference with the 4 mm thickness ($p = 0.019$) while there remained no difference between the 2 mm and 3 mm ($p = 0.265$) or between the 3 mm and 4 mm ($p = 0.297$). At three months, the 3 mm and 4 mm samples maintained similar specific heat ($p = 0.070$) but the specific heat of the 2 mm samples was significantly increased compared to the 3 mm and 4 mm thicknesses ($p < 0.0001$).

Comparison of the specific heat results of all three materials demonstrate an increase in specific heat with increased time which suggests a change in the respective materials. At the end of the storage time all three materials did not exhibit a significant difference in the specific heats between the 2 mm and 3 mm samples as well as between the 3 mm and 4 mm samples. Except for Fuji II LC, the samples did maintain a significant difference between the 2 mm and 4

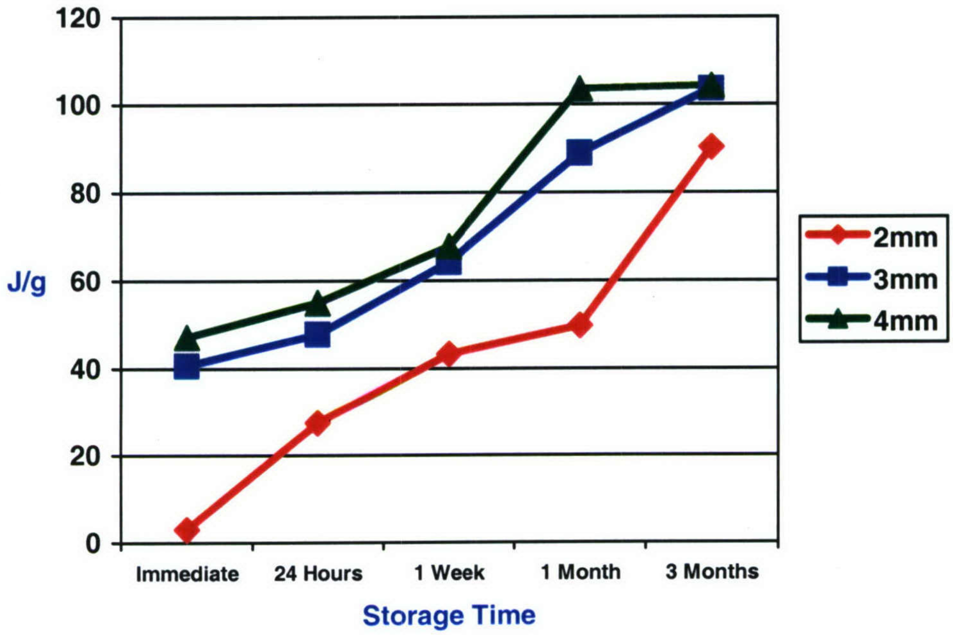
mm samples. However, the results with Fuji II LC samples need to be interpreted with caution, as the 2 mm group demonstrated wide variation.

Thermal Scan

The differential scanning calorimetry (DSC) thermal scan method employed during this evaluation followed the same protocol as Khalil and Atkins.[61] Accordingly, after the specific heat determination the samples were weighed and then submitted to a thermal scan of 37 °C to 240 °C at a rate of 10 °C per minute. A reverse scan from 240 °C to 37 °C was not accomplished as pilot studies with all three materials did not reveal any results. Results of the thermal scan are reported as both thermal peak temperature, i.e. the temperature at the minimum of the endothermic peak, and total enthalpy of the peak. This was accomplished by software integration, with all samples normalized for sample size. For graphical and analysis simplicity, total enthalpy is presented as a positive number, although the peaks were endothermic, meaning the value was really negative.

Graphic results for the Vitremer samples thermal scan is presented in Figure 28.

Figure 28. Vitremer Mean Thermal Scan Enthalpy Results (J/g)



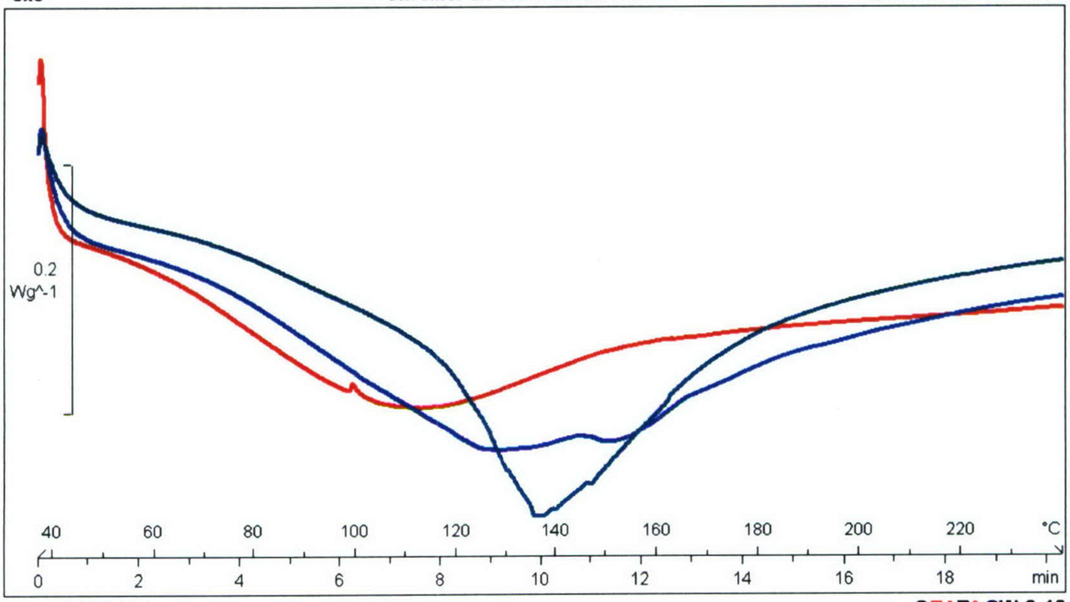
n = 5

As storage time progressed all samples demonstrated an increase in thermal enthalpy that was associated with the thermal peak. One-way ANOVA of the results at each storage time revealed that there was no significant difference for enthalpy findings between the 3 mm and 4 mm samples throughout the time period. The 2 mm samples were significantly different than the 3 mm and 4 mm samples at all time periods ($p < 0.004$) except for at three months, where there was no significant difference noted between all three thicknesses ($p = 0.665$).

Representative images of the Vitremer thermal scans can be seen in Figures 29 – 32. It can be observed as the materials mature the individual peaks evolve from broad, ill-defined endothermic curves into more uniform, symmetrical curves whose peak temperatures can be readily defined. This thermal behavior is consistent with materials that are becoming more uniform. As will be discussed next, it can also be observed that the thermal peak temperatures display a trend towards migrating to a common value.

Figure 29. Vitremer 24 Hour Mean Thermal Scans

^exo Vitremer 24 Hour Mean Curves 31.03.2006 19:32:51



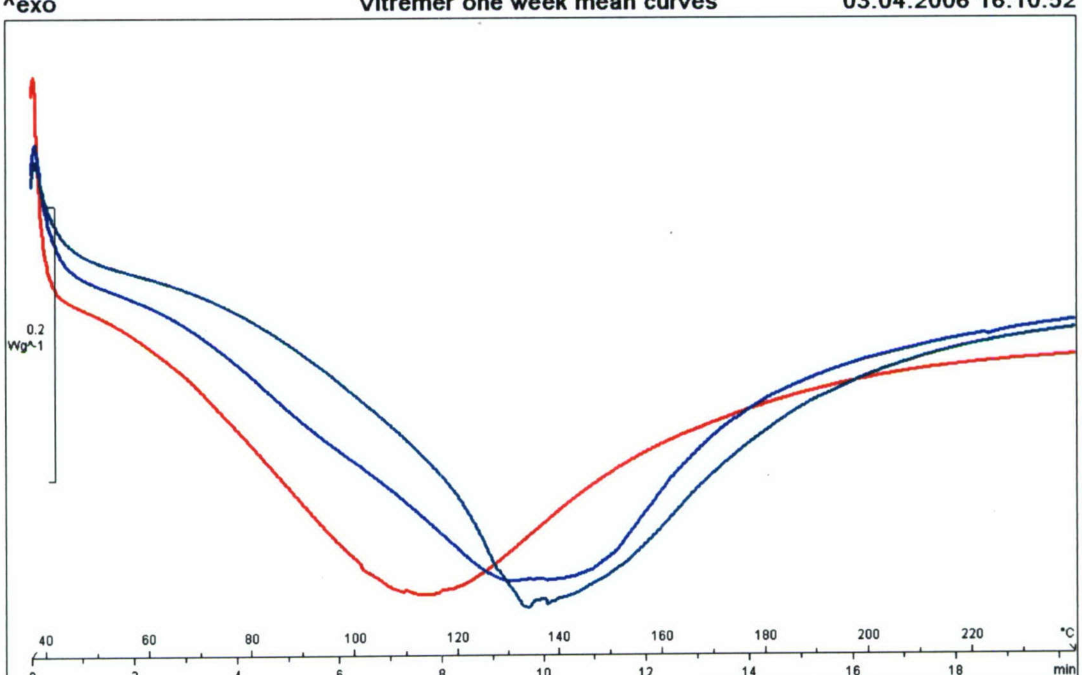
Lab: METTLER STAR® SW 8.10

n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

Figure 30. Vitremer One Week Mean Thermal Scans

^exo Vitremer one week mean curves 03.04.2006 16:10:52

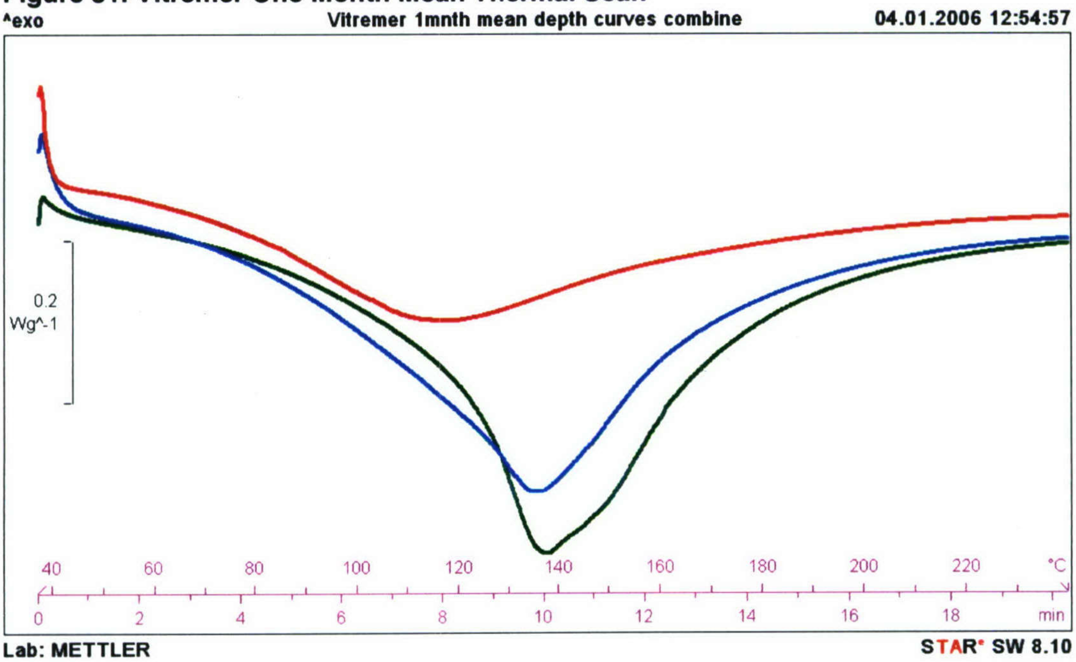


Lab: METTLER STAR® SW 8.10

n = 5

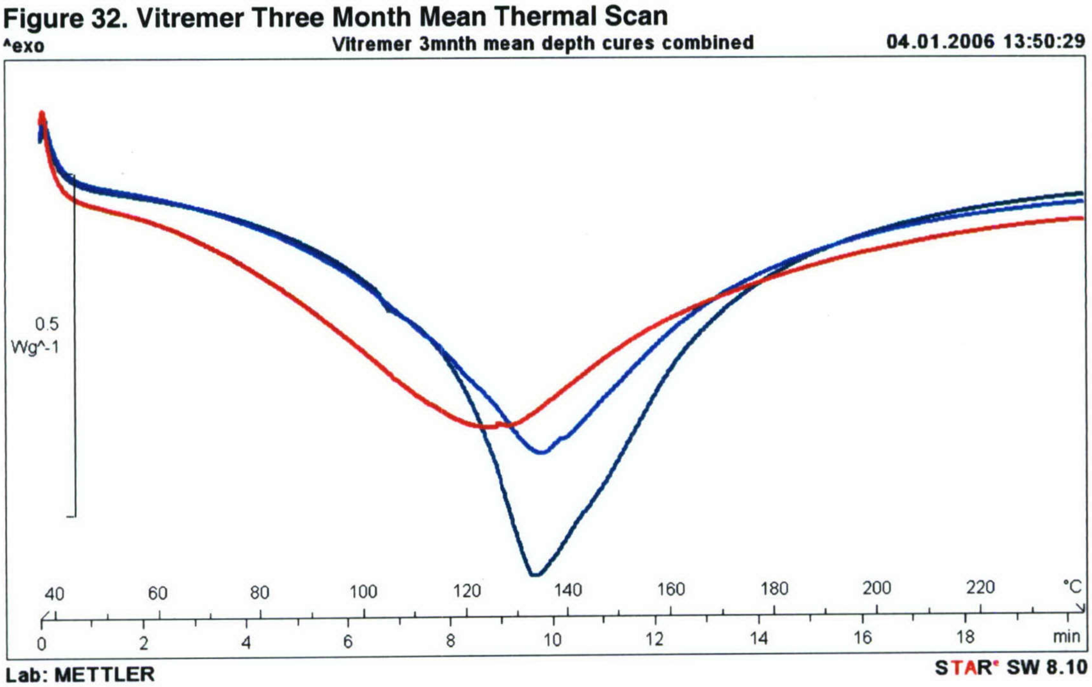
Red = 2 mm, Blue = 3 mm, Green = 4 mm

Figure 31. Vitremer One Month Mean Thermal Scan



n = 5
Red = 2 mm, Blue = 3 mm, Green = 4 mm

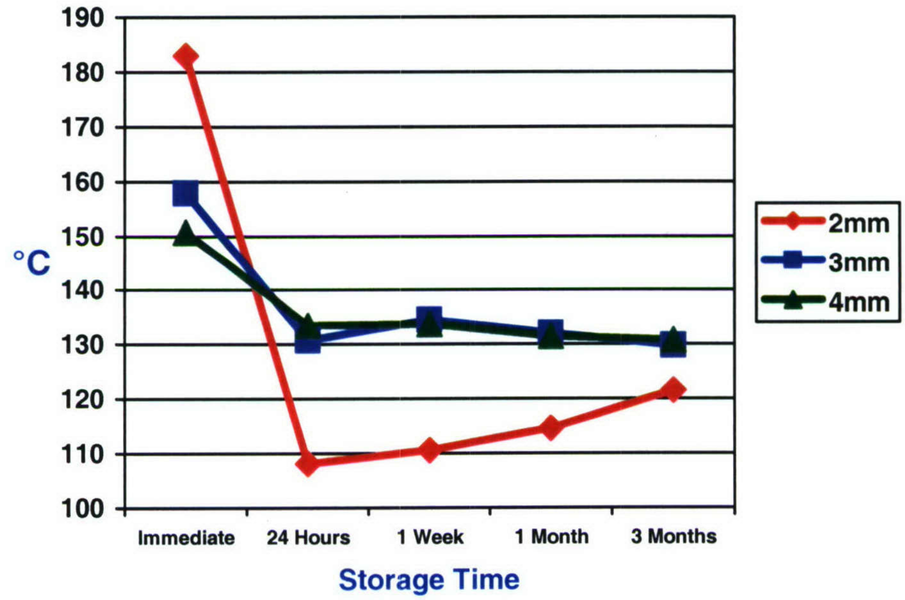
Figure 32. Vitremer Three Month Mean Thermal Scan



n = 5
Red = 2 mm, Blue = 3 mm, Green = 4 mm

The analysis of the thermal peak temperatures for the Vitremer samples can be seen in Figure 33.

Figure 33. Vitremer Thermal Scan Mean Peak Temperature Results (°C)



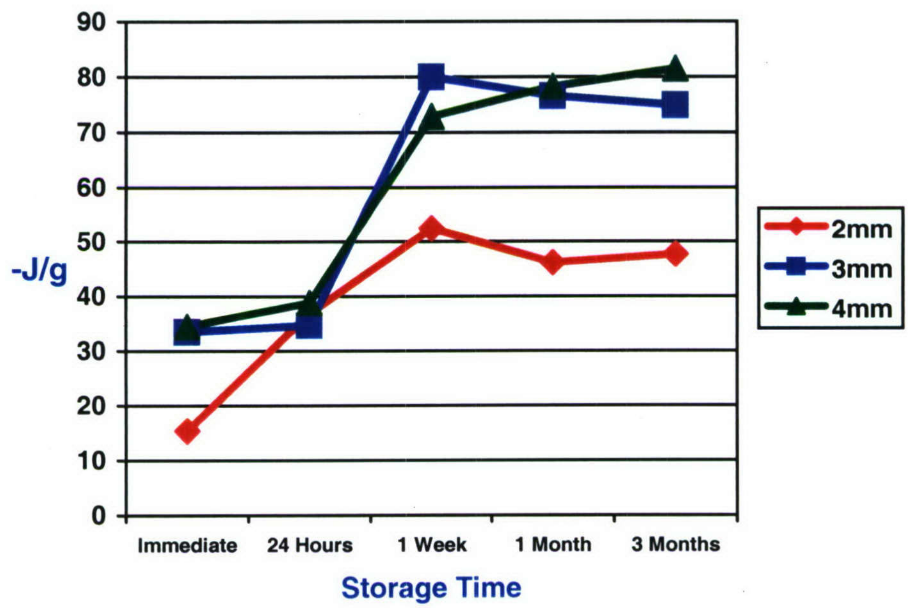
n = 5

The mean thermal peak temperature of the 3 mm and 4 mm samples were statistically similar throughout the evaluation ($p > 0.272$). However, the immediate 2 mm samples demonstrated a significantly higher thermal peak temperature than the 3 mm and 4 mm ($p < 0.0001$) immediately after fabrication and significantly reduced than the other thicknesses at 24 hours ($p < 0.0001$). As time progressed the 2 mm samples demonstrated a rising trend that tended to approach the thermal peak temperatures of the 3 mm and 4 mm samples. However, at three months the 2 mm samples still maintained a significant difference ($p < 0.012$).

The mean enthalpy values of the Fuji II LC thermal scans are depicted in Figure 34. All samples demonstrated a significant increase in enthalpy as storage time progressed ($p < 0.0001$) with all samples demonstrating the most increase between fabrication and one week. After one week, there was no difference in mean thermal scan enthalpy between the remaining

storage time intervals ($p > 0.187$). Significant differences were found between the enthalpy requirements of the 2 mm and the other samples ($p = 0.002$) but no difference in enthalpy was noted between the 3 mm and 4 mm samples ($p = 0.975$).

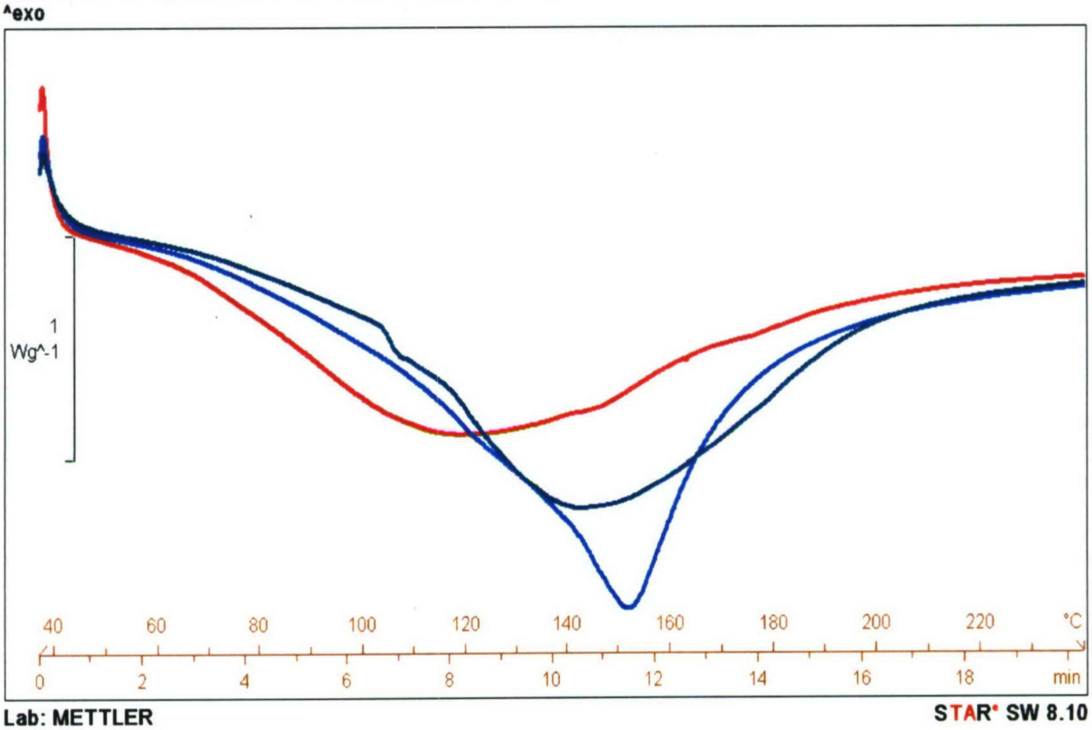
Figure 34. Fuji II LC Mean Thermal Scan Enthalpy Results (-J/g)



n = 5

Representative thermal scans of representative Fuji II LC samples are depicted in Figures 35 and 36. As with the Vitremer, the Fuji II LC samples display some increase in uniformity with aging and the migration of the thermal peaks towards a common value.

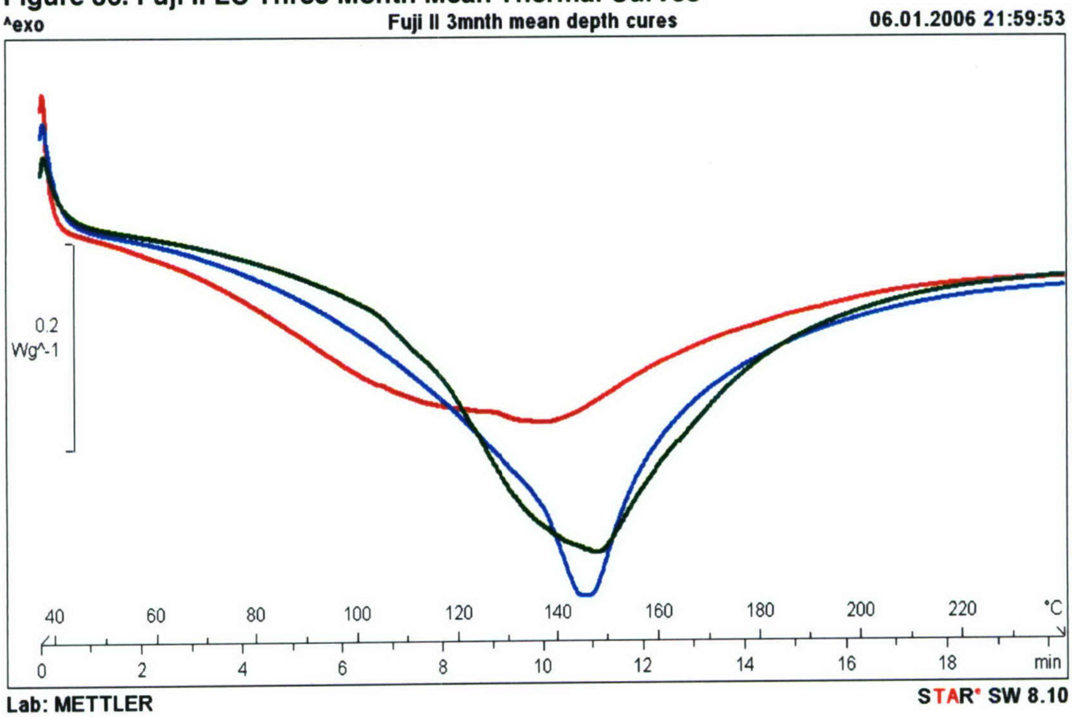
Figure 35. Fuji II LC One Week Mean Thermal Scans



n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

Figure 36. Fuji II LC Three Month Mean Thermal Curves

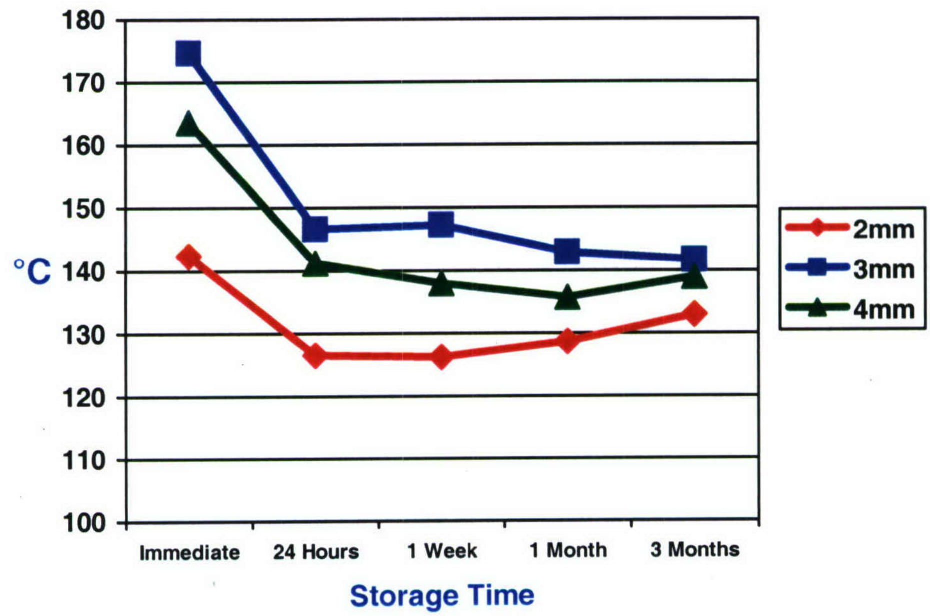


n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

The mean thermal peak temperatures of the Fuji II LC samples are depicted in Figure 37. With this material, the 3 mm depth samples displayed the highest mean thermal peak temperatures; the 2 mm samples the lowest temperature, while the 4 mm samples an intermediary temperature between the two extremes. The immediate Fuji II LC thermal peak temperatures were not significantly disparate ($p = 0.301$) as well as at 24 hours ($p = 0.053$). At one week, the 2 mm and 3 mm samples were significantly different ($p = 0.003$) which was maintained at one month ($p = 0.004$). At three months, the mean thermal peak temperatures of the different thicknesses were merging and were statistically similar ($p = 0.116$).

Figure 37. Fuji II LC Thermal Scan Mean Peak Temperature Results (°C)

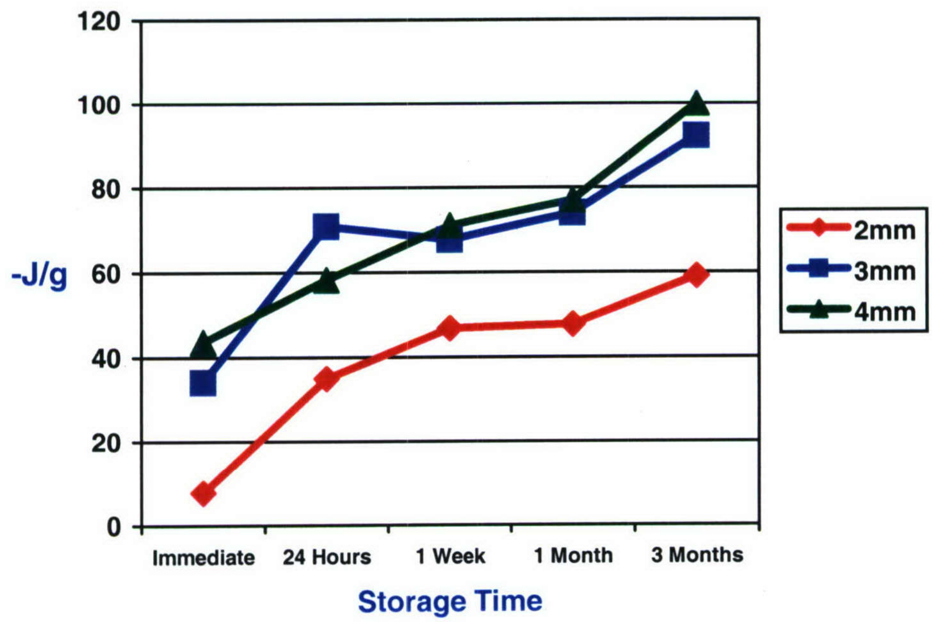


n = 5

All of the Photac-Fil Quick samples (Figure 38) demonstrated a significant increase in thermal scan enthalpy requirements as storage time increased ($p < 0.0001$). The thermal scans of the samples demonstrated a significant increase between fabrication and 24 hours ($p = 0.001$) after which the loss stabilized with no significance between groups until one month ($p > 0.431$).

Although the samples demonstrated an increasing trend after one month, there was no difference noted between the one-month and three-month samples ($p = 0.079$). Throughout the storage period the 2 mm samples required significantly less enthalpy than the other thicknesses ($p < 0.0001$) while no difference was noted between the 3 mm and 4 mm samples ($p = 0.926$).

Figure 38. Photac-Fil Quick Mean Thermal Scan Enthalpy Results (J/g)

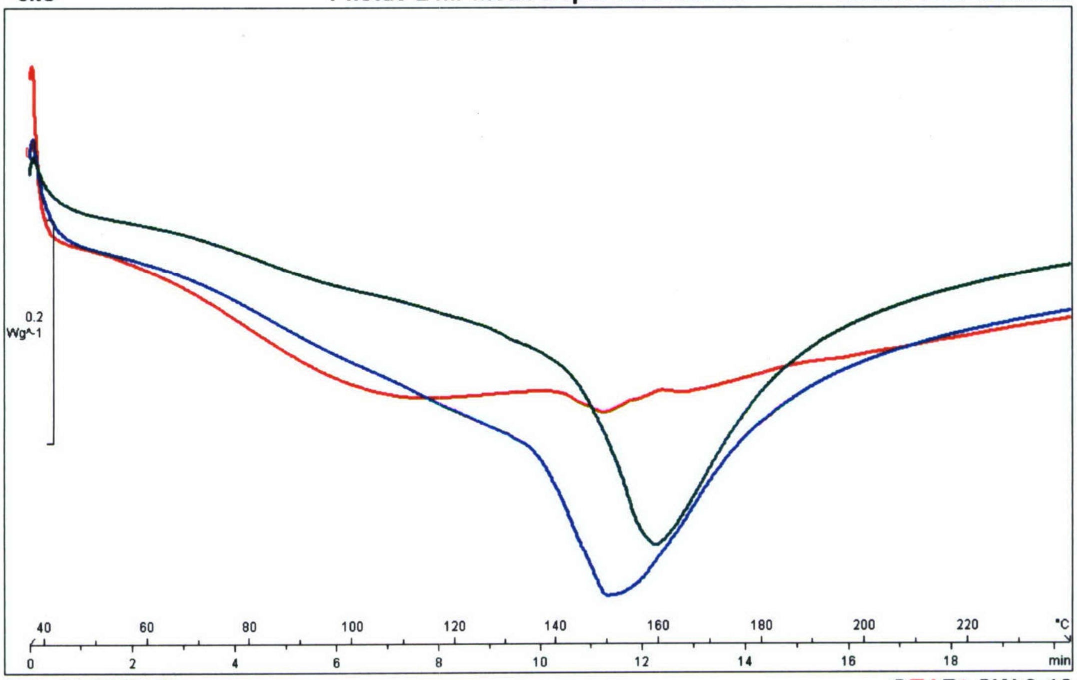


n = 5

Representative thermal scans of Photac-Fil Quick can be seen in Figures 39 – 42. In contrast with the other two materials, the 3 mm and 4 mm Photac-Fil Quick samples displayed uniform endothermic peaks from the outset whose peaks became more focused with maturity. The 2 mm Photac-Fil Quick endothermic peak was nondescript at 24 hours but gained uniformity as time progressed and the peak temperature was also observed to shift towards that observed by the other two thicknesses.

Figure 39. Photac-Fil Quick 24 Hour Mean Thermal Scans

^exo Photac 24hr Mean Depth cure curves 29.03.2006 16:19:32



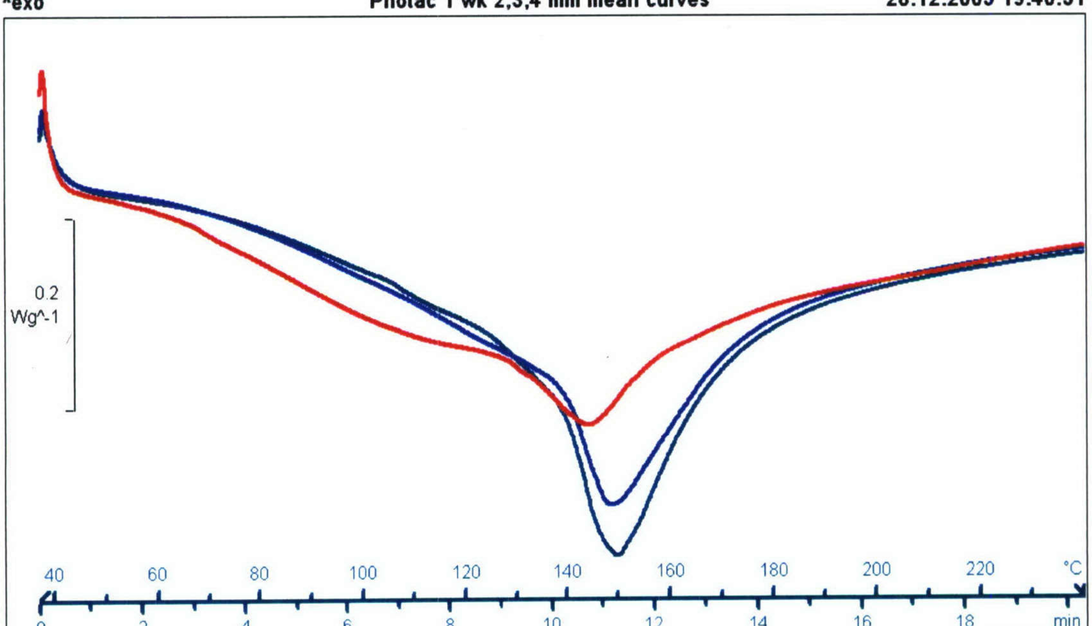
Lab: METTLER STAR® SW 8.10

n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

Figure 40. Photac-Fil Quick One Week Mean Thermal Scans

^exo Photac 1 wk 2,3,4 mm mean curves 28.12.2005 19:40:31

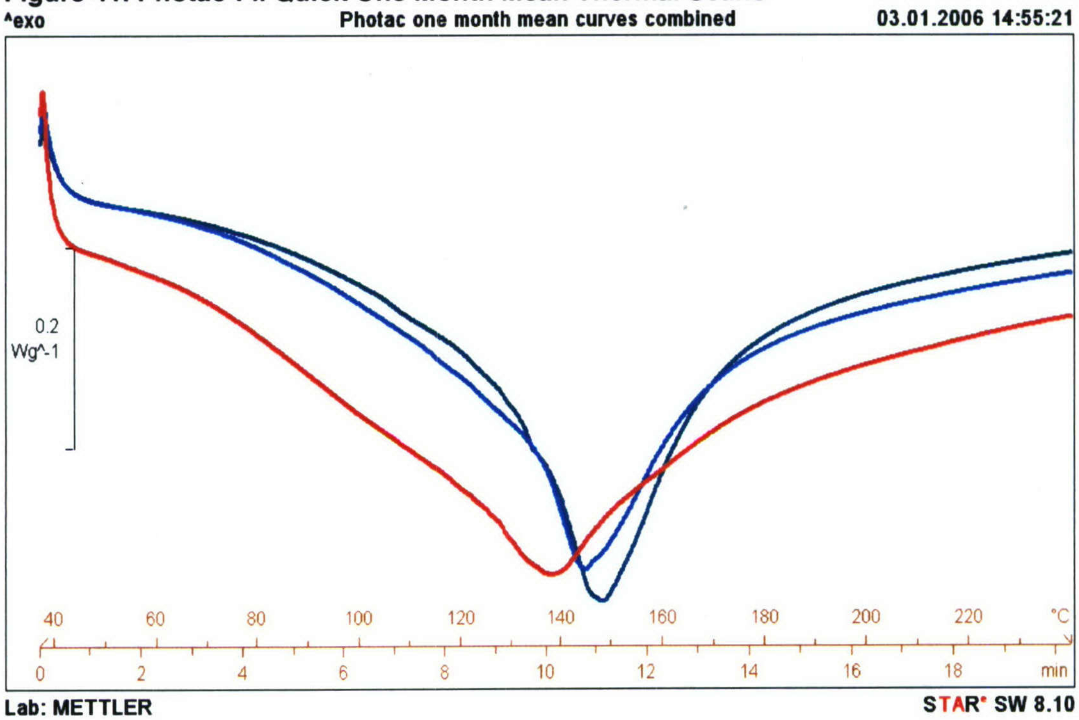


Lab: METTLER STAR® SW 8.10

n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

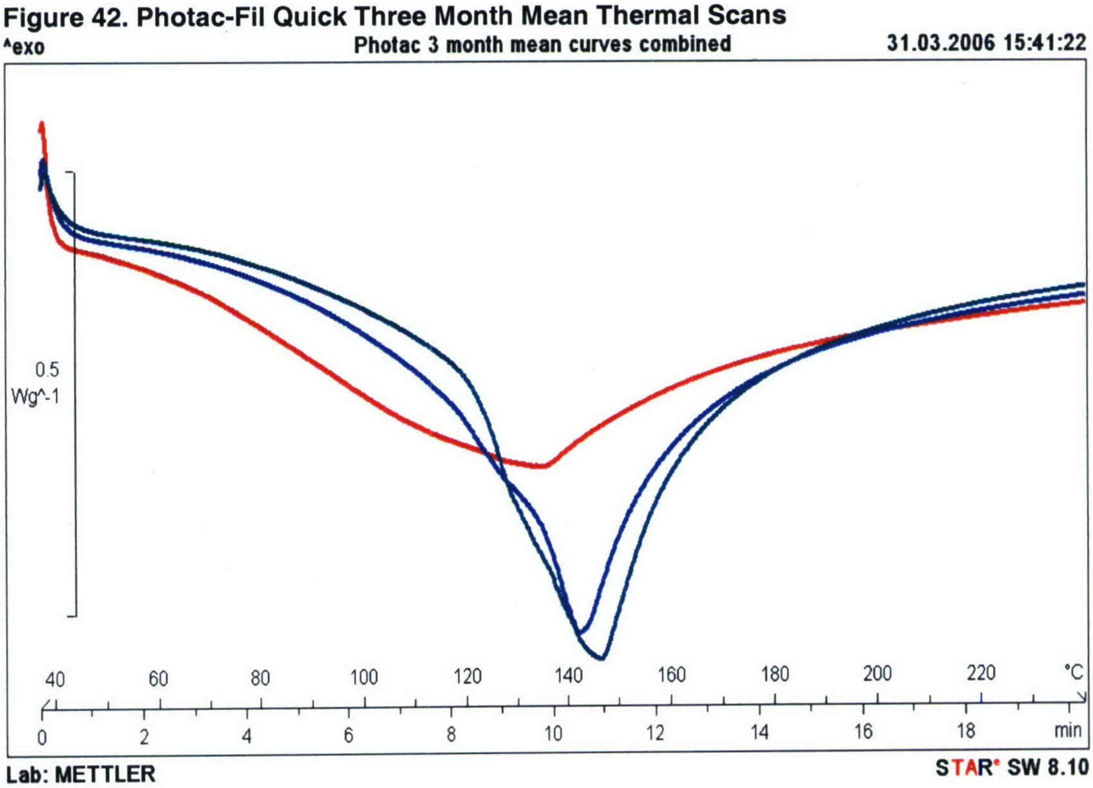
Figure 41. Photac-Fil Quick One Month Mean Thermal Scans



n = 5

Red = 2 mm. Blue = 3 mm. Green = 4 mm

Figure 42. Photac-Fil Quick Three Month Mean Thermal Scans

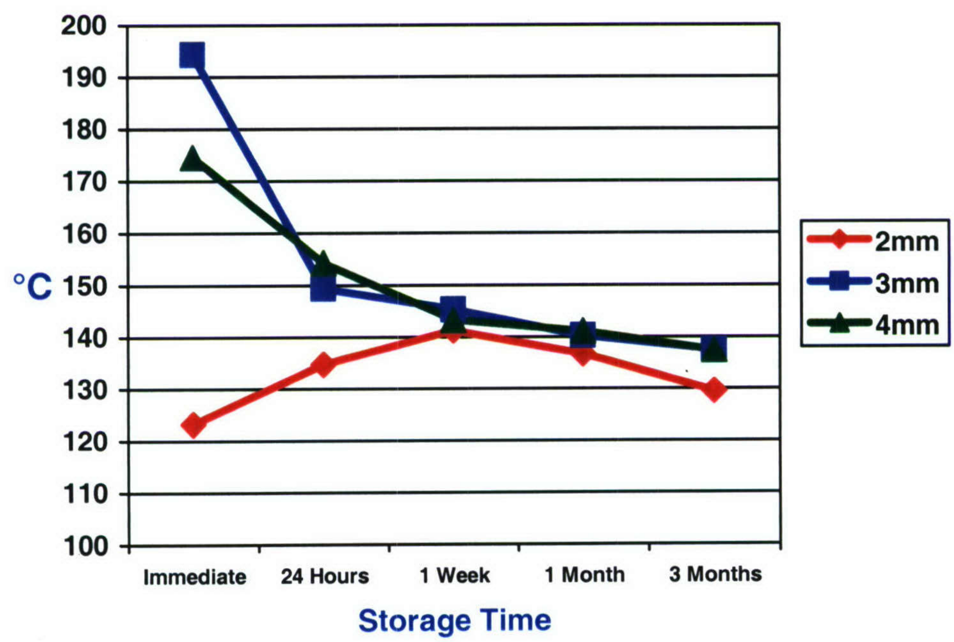


n = 5

Red = 2 mm, Blue = 3 mm, Green = 4 mm

The mean thermal peak temperatures of the Photac-Fil Quick samples are depicted in Figure 43. Similar to Fuji II LC, the 3 mm samples demonstrated the highest thermal peak temperature with the 2 mm samples the lowest. The 4 mm samples maintained a thermal peak temperature that was intermediary to the other thicknesses. The 2 mm samples were significantly lower than the 3 mm samples ($p = 0.007$) as well as the 4 mm samples ($p = 0.047$) but the 3 mm and 4 mm groups were statistically similar ($p = 0.569$). As with the other two materials, all three thicknesses of the Photac-Fil Quick samples demonstrated a merging trend of the peak temperatures with the passage of time. At 24 hours there was no difference between the samples ($p = 0.121$), as well as at one week ($p = 0.151$). However, at one month the merging trend was disrupted by a significant difference between the 2 mm and the other thicknesses ($p < 0.033$) which continued at three months ($p = 0.002$).

Figure 43. Photac-Fil Quick Thermal Scan Mean Peak Temperature Results (°C)



n = 5

All three resin-modified glass-ionomer restorative materials demonstrated increasing thermal requirements for the DSC thermal scan with storage time, although all achieved such displaying distinct thermal behavior. Vitremer samples displayed an increasing rate throughout the

evaluation while Fuji II LC demonstrated a rise in thermal requirements at one week that essentially reached a plateau for the remainder of the observation time. Photac-Fil Quick reached a similar plateau at one week, which was maintained at one month but then evidenced an increasing trend for thermal requirements at one month. Collectively the data indicates different thermal behavior for all of the materials with increased storage time, which is evidence that all of the materials are exhibiting change in composition. The individual thermal behavior of these materials will demand more attention and evaluation: it remains to be determined if the early plateau reached by Fuji II LC is evidence of the formation of a mature and/or stable composition. As glass-ionomer materials are known to require considerable time to reach maturity, only longer periods of observation will be able definitively demonstrate this behavior by thermal means.

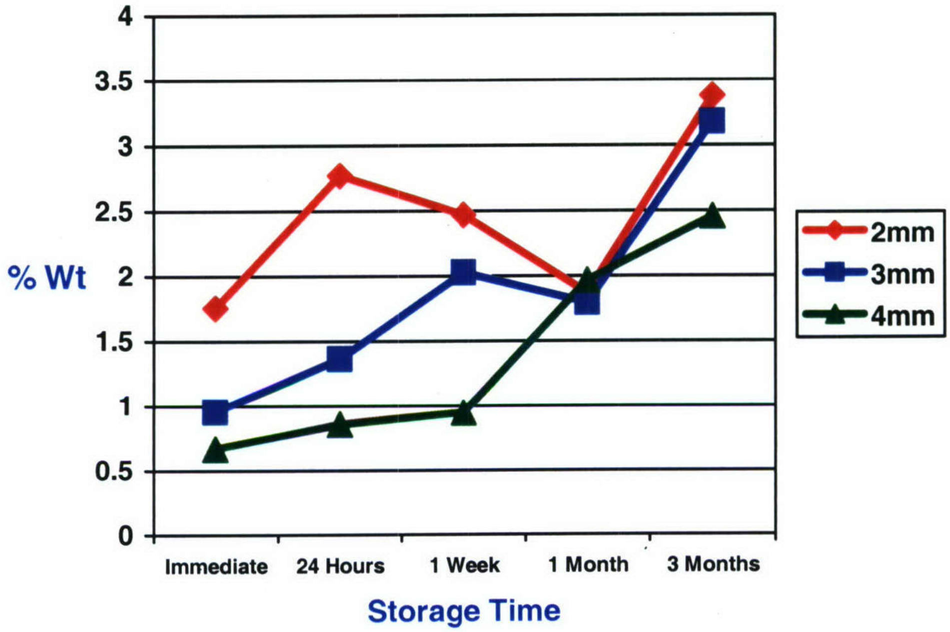
The peak temperature of the DSC thermal peak provides additional information concerning these RMGI materials. The peak temperature of a thermal measurement during DSC can provide material composition characteristics almost in the same manner as glass transition temperatures and melting points. It is interesting that all three of the resin-modified glass-ionomer materials demonstrated similar behavior in regards to thermal peak temperatures during the thermal scans. Each material demonstrated, especially with the 3 mm and 4 mm samples, higher mean thermal peak temperatures immediately after fabrication that slowly lessened with storage time. Moreover, as storage time increased, the temperatures also displayed a trend of merging towards the same range of temperatures, to the point that at intermediary times there was no significance between the peak temperatures of the Photac-Fil Quick samples, while at three months there was no significant difference between the mean thermal peak temperatures of the Fuji II LC samples. The merging of the mean peak temperature values provides additional evidence of material compositional change with the resin-modified glass-ionomer materials. Furthermore, as the peak temperatures approximate each other it suggests that the composition of each respective material is becoming more similar.

The RMGI materials were all evaluated for the different weight changes during all phases of thermal analysis, as investigation into these weight changes could provide information concerning the water uptake, ratio of loosely bound to firmly bound water, as well as possible polymer development in these materials.

Not surprisingly, all of the materials were observed to significantly increase in weight as storage time progressed. Any weight gain during storage in the 98 ± 2 percent humidity conditions was assumed to be due to water uptake. As with conventional glass-ionomer materials, RMGIs have been documented to absorb water, as water uptake is essential for the continuation of the polyalkenoate reaction.[3,21,93] Furthermore, all three materials were also noted to experience significant weight loss during the specific heat determinations. Any weight loss observed during the specific heat determinations was assumed to be predominately due to water loss, presumably of the loosely bound nature. This assumption is founded on the short time duration of the specific heat determination scans (20 minutes) and the narrow temperature range involved (20 °C to 60 °C) that was decidedly below the boiling point of both water and HEMA.

An interesting finding regarding the weight loss during the specific heat determinations (presumed to be loosely-bound water) among the three materials is that each material demonstrated different behavior in the nature of the loosely-bound water loss. The Vitremer (Figure 44) 2 mm and 3 mm samples lost significantly more water at three months than at the onset ($p < 0.0001$) while the 4 mm samples demonstrated a similar trend towards increased water loss, but yet is was not significant. The 2 mm samples demonstrated a trend for decrease in water loss after 24 hours that continued until one month, with the 3 mm samples displaying similar behavior after one week. At one month there was no significant difference in water loss between all thicknesses, and although the 2 mm and 3 mm samples displayed a greater amount of water loss compared to the 4 mm samples at three months, no significant difference remained among the groups ($p = 0.357$).

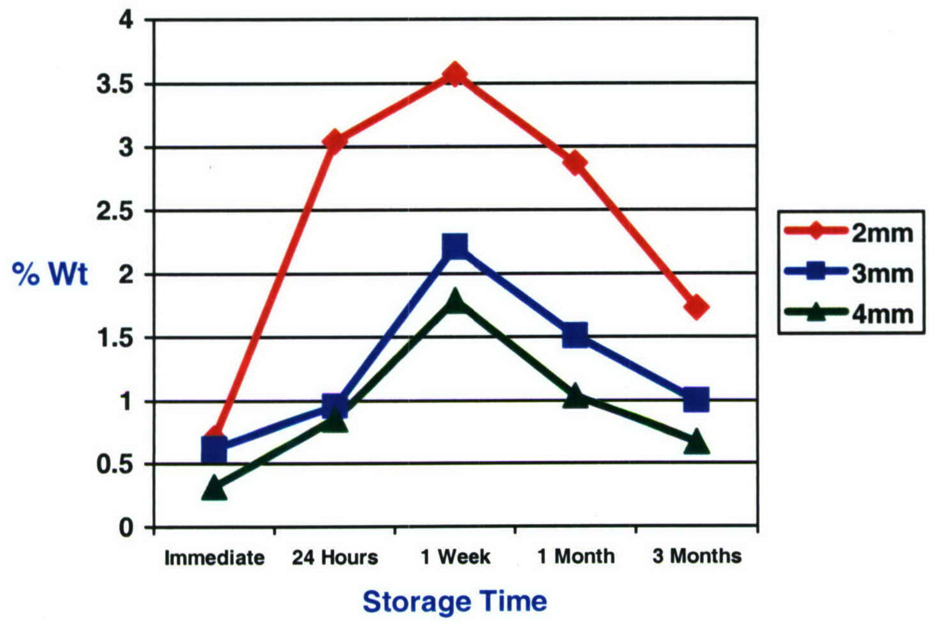
Figure 44. Vitremer Mean Water Loss During Specific Heat Determination (% Wt)



n = 5

The Fuji II LC samples (Figure 45) also demonstrated an increasing trend of water loss during the specific heat determinations with storage time but did so in a manner different than Vitremer.

Figure 45. Fuji II LC Mean Water Loss During Specific Heat Determination (% Wt)

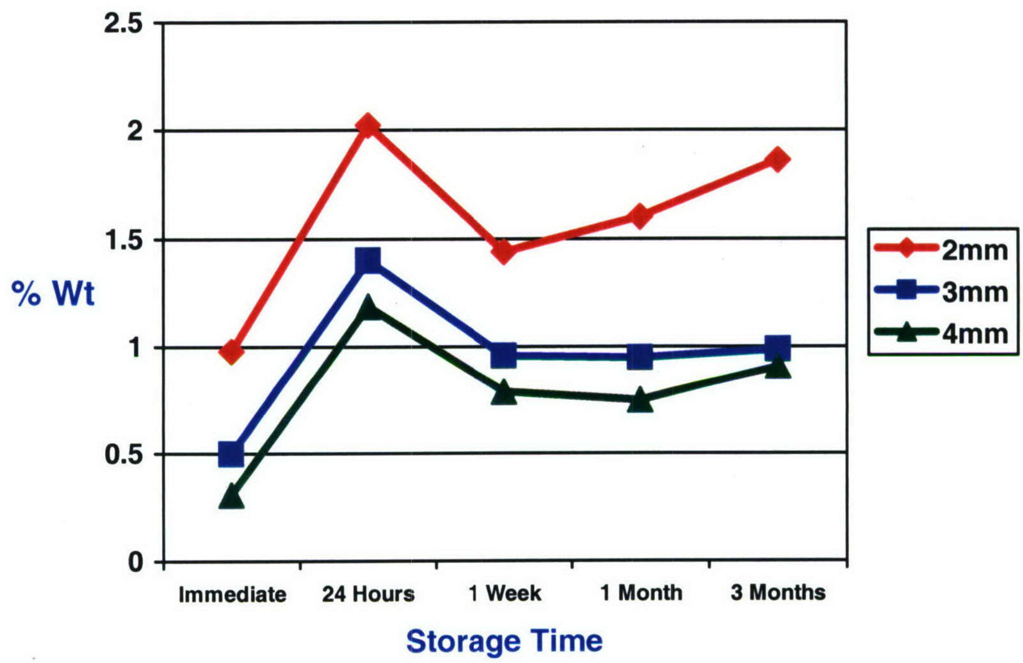


n = 5

At the end of the three months, each thickness of Fuji II LC samples did not experience a significant difference in water loss compared to the water loss with the immediate groups ($p > 0.437$). However, during the storage time all three thicknesses experienced a significant increase in water loss ($p < 0.001$) that reached a maximum at one week and then declined. Except for the immediate groups, the Fuji II LC 2 mm samples lost significantly more water than the 3 mm and 4 mm groups ($p < 0.0001$), while the latter two groups were not significantly different ($p = 0.459$).

The water loss behavior during the specific heat determinations for the Photac-Fil Quick samples is displayed in Figure 46.

Figure 46. Photac-Fil Quick Mean Water Loss During Specific Heat Determination (% Wt)



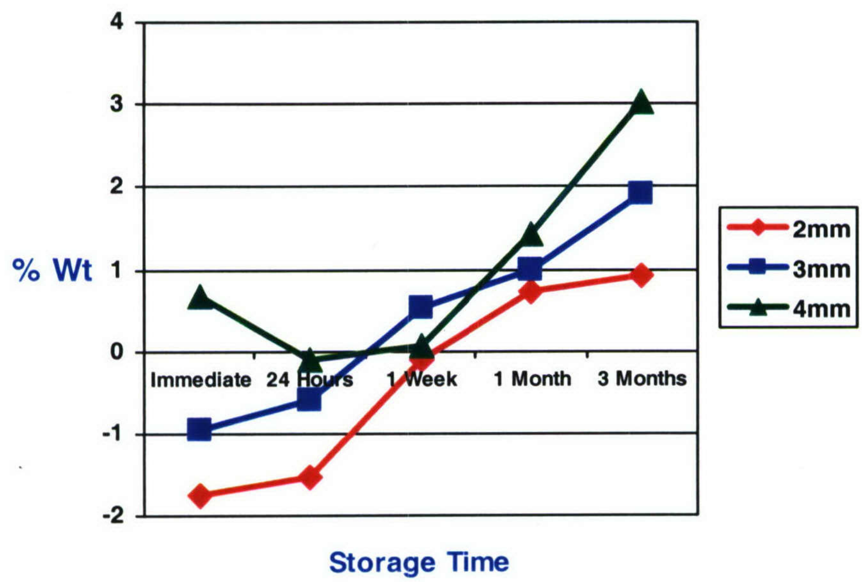
The Photac-Fil Quick samples displayed an increase in water loss with time similar to Fuji II LC except that the maximum water loss peaked at the 24-hour storage time. After one week the 2 mm samples continued on an increased trend for water loss while the other thicknesses maintained relatively stable. One-way ANOVA identified that over the total storage time the 2 mm Photac-Fil Quick samples lost significantly more water during the specific heat determinations ($p < 0.0001$) compared to the 3 mm and 4 mm samples which were statistically similar ($p = 0.219$). Within the Photac-Fil Quick groups the 2 mm and 4 mm samples lost significantly more water at three months compared to the immediate samples ($p < 0.002$), while the 3 mm samples maintained statistical similarity ($p = 0.054$). However, all thicknesses demonstrated a significant increase in water loss at the 24-hour peak as that experienced by the immediate groups.

The difference between the weight gain during storage (water uptake) and weight loss during the specific heat determinations (loosely held water loss) results in the net retention of water,

and provides some insight into the development of the more firmly bound water associated with the maturation of the polyalkenoate hydrogel matrix.

All three materials demonstrated a significant change in the net water retention during the specific heat determination for the storage times evaluated. The results of all thicknesses of the

Figure 47. Vitremer Mean Net Water Retention During Specific Heat Determination (% Wt)



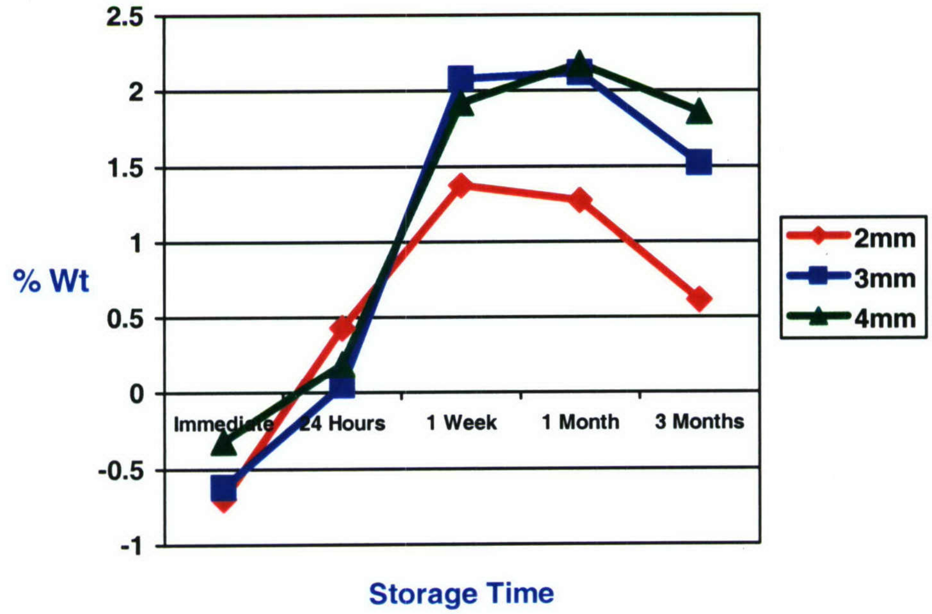
n = 5

Vitremer samples are graphically depicted in Figure 47. Two-way ANOVA identified that the Vitremer samples demonstrated a significant increase in net water retention both per thickness and storage time ($p < 0.0001$). One-way ANOVA for net water retention between the thicknesses found no significant difference between the 2 mm and 3 mm samples ($p = 0.241$) but identified significantly more net water retention between the 4 mm and the 2 mm samples ($p = 0.043$). Although the 2 mm samples gained weight during storage time, Scheffe *post hoc* analysis did not identify any significant change in net water retention due to large standard deviations among the sample means. A significant change was identified within the 3 mm samples ($p < 0.0001$), with significant net retention of water increasing at all storage times except between the immediate and 24 hour samples. A significant change was also noted

within the 4 mm samples ($p < 0.0001$), with significant gains identified between storage times after one week. The data indicates that at approximately one week the Vitremer samples began to show evidence of some water retention within the material.

The mean net water retention results during the specific heat determination results for the Fuji II LC samples can be observed in Figure 48.

Figure 48. Fuji II LC Mean Net Water Retention During Specific Heat Determination (% Wt)



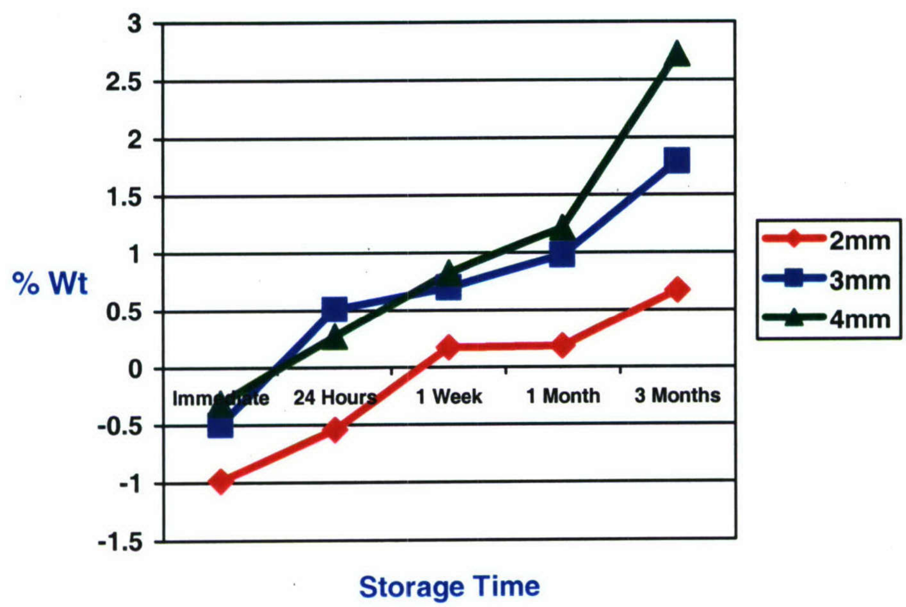
n = 5

Two-way ANOVA identified significant changes in net water retention during specific heat determinations for the Fuji II LC samples for both thickness and storage time ($p < 0.0001$). All the thicknesses demonstrated an increasing trend for increased water retention with storage time that appeared to peak at one week or one month. Within the individual thicknesses, although the samples demonstrated a significant gain in water retention up to at least one week that was followed with a decrease at three months, the 2 mm samples still maintained a significant gain in water retention at three months as compared to the immediate group ($p < 0.0001$). All of the thicknesses displayed statistical similarity in net water retention immediately

after fabrication and at 24 hours, but at one week the 3 mm and 4 mm samples displayed significantly greater net water retention than the 2 mm specimens that was maintained up to three months ($p < 0.001$). The Fuji II LC samples demonstrated net water retention at approximately 24 hours that was earlier than that seen by the Vitremer samples.

The mean net water retention results during the specific heat determination results for the Photac-Fil Quick samples can be observed in Figure 49.

Figure 49. Photac-Fil Quick Mean Net Water Retention During Specific Heat Determination (% Wt)



n = 5

The Photac-Fil Quick samples displayed net water retention behavior during the specific heat determinations similar to that evidenced by the Vitremer samples. All samples demonstrated a significant increase in net water retention at three months ($p < 0.0001$) as compared to after immediate fabrication while the 3 mm and 4 mm thicknesses were found to exhibit significantly more water retention than the 2 mm samples ($p < 0.006$). The 3 mm and 4 mm Photac-Fil Quick samples exhibited net water retention starting at 24 hours while the 2 mm samples required one week.

Both Vitremer and Photac-Fil Quick displayed similar behavior regarding net water retention during the specific heat determinations. Fuji II LC demonstrated a different behavior marked by a trend of decreasing net water retention after a significant gain at one week. It is not known at this time if this trend would continue, but further analysis is planned to follow this material's behavior. It is this author's contention that this net water retention analysis provides some evidence of early mature hydrogel formation in these RMGI materials. Using this criterion, based on the conditions of this evaluation it appears that it requires one week for evidence of firmly-bound water in the matrix of both Vitremer and Photac-Fil Quick whereas evidence of the same with Fuji II LC is apparent at 24 hours.

In comparing the water loss and water retention behavior of the three RMGI materials, all materials displayed increasing water loss that was somewhat offset by increasing amounts of water retention as time progressed. It should also be noted that the thinner samples, especially the 2 mm thickness, appeared to demonstrate more water loss and less net water retention than the 3 mm or 4 mm samples. This behavior may be explained by the consideration that all of these samples were enclosed in aluminum calorimetry crucibles in which the RMGI materials displayed only one open surface to the calorimeter environment. With all three thicknesses having roughly the same surface area exposed, the thicker specimens would be expected to retain more water due to the time requirement for diffusion to take place.

Vitremer gave evidence of an interaction of water loss/net water retention behavior with a possible correlation between the two factors (Pearson's 0.316, $p = 0.006$) but this was discovered to be a weak correlation as linear regression did not identify any significant relationship ($R^2 = 0.10$). Moreover, the same behavior was seen with Fuji II LC (Pearson's 0.301, $p = 0.009$; $R^2 = 0.091$) but no such correlation was identified with Photac-Fil Quick ($p = 0.450$). It appears evident that there is no significant relationship between the water loss behavior and the amount of net water retained during the specific heat determinations. Certainly a relationship can be established between the amount of water gained during storage

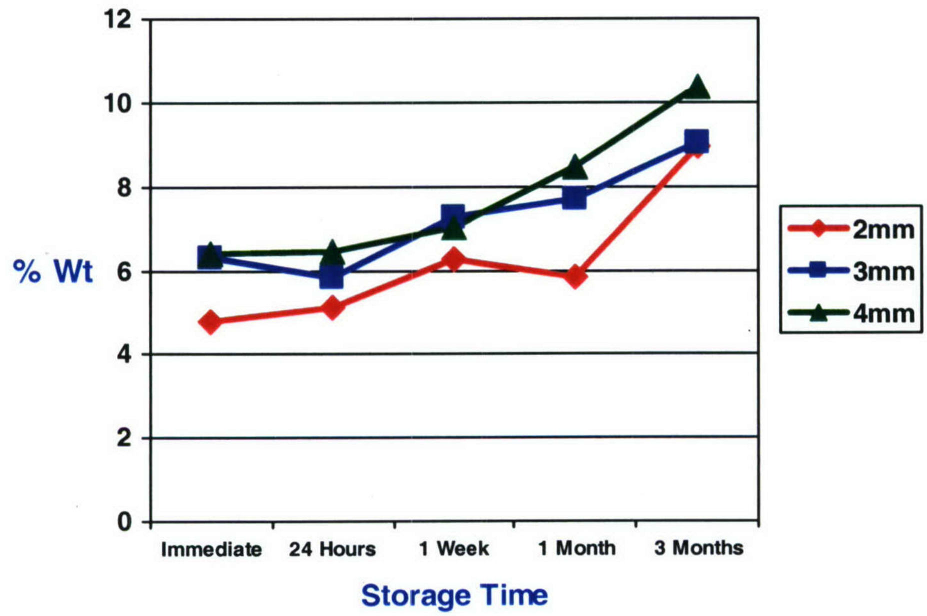
and net water retention for all three materials using linear regression (Vitremer, $R^2 = 0.800$; Fuji II LC, $R^2 = 0.629$; Photac-Fil Quick, $R^2 = 0.747$) but this certainly begs the rationalization: water must be gained during the storage periods to be able for the water to be retained during the specific heat determinations.

The effect of net water content on the development of specific heat capacity must be considered, as mature glass-ionomer materials are postulated to contain up to five percent unbound water and anywhere from 18 to 28 percent bound water.[93] Water has a reported specific heat capacity of 4.186 J/g°C[90] and hence, more water content within a material could possibly affect its specific heat value. When analyzing any possible relationship between Vitremer water retention behavior and specific heat values, linear regression did not identify any strong relationships between net water retention ($R^2 = 0.014$) or water gain during storage ($R^2 = 0.184$). Similar results were found for Fuji II LC (net water retention, $R^2 = 0.042$; water gain, $R^2 = 0.370$) or Photac-Fil Quick (water gain, $R^2 = 0.0707$; net water retention, $R^2 = 0.011$). Interestingly, there appeared to be a stronger relationship between water loss during the specific heat determinations and specific heat values (Vitremer $R^2 = 0.540$; Fuji II LC $R^2 = 0.576$; Photac-Fil Quick $R^2 = 0.547$). The significance of these findings remains obscure at this time.

The resin-modified glass-ionomer materials were also analyzed for weight loss during the DSC thermal scan for identification of trends. In addition, the total weight loss during the specific heat determinations and the thermal scan was evaluated for similar reasons and these weight losses were compared to water gain during storage.

The Vitremer thermal scan weight loss data is depicted in Figure 50.

Figure 50. Vitremer Thermal Scan Mean Weight Loss (% Wt)

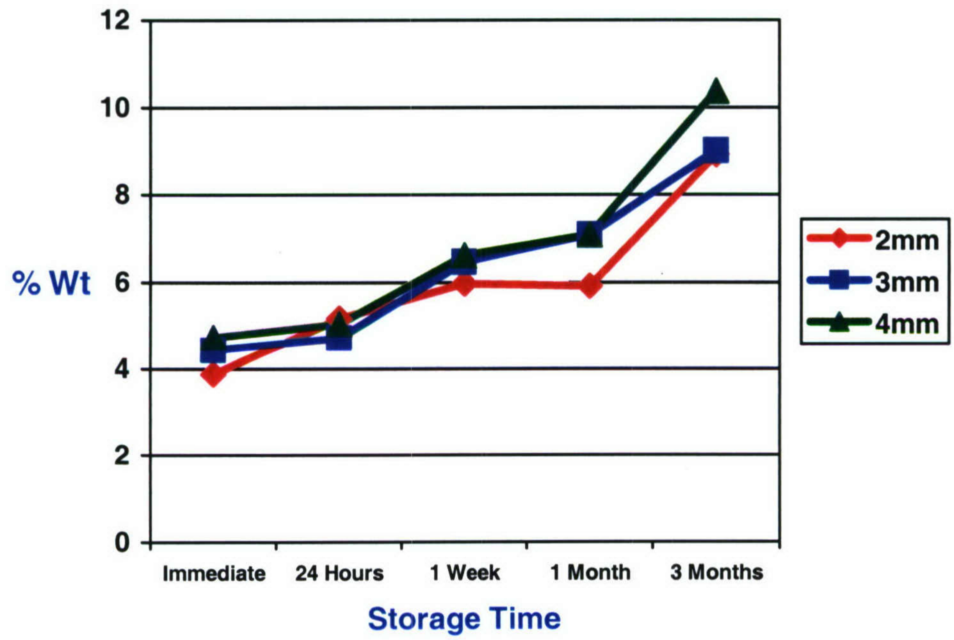


n = 5

All thicknesses experienced significantly more weight loss during the thermal scan with increased storage time ($p < 0.0001$), with each thickness roughly displaying the same trend of weight loss. The 3 mm and 4 mm samples displayed parallel increasing weight loss behavior with increased storage time, but the 2 mm samples developed a decrease from one week to one month which then became almost identical to the 3 mm trend at three months. The 2 mm samples demonstrated significantly less weight loss during that thermal scan than the 4 mm samples ($p = 0.006$) while all other thicknesses were similar in weight loss.

The Fuji II LC thermal scan weight losses are posted in Figure 51. Considering total weight loss over the storage time, the Fuji II LC samples demonstrated a significant increase in weight loss ($p < 0.0001$). When evaluated between the sample thicknesses, the 4 mm groups demonstrated significantly more weight loss ($p = 0.037$) than the 2 mm samples, while no statistical difference was identified between the 2 mm and 3 mm as well as between the 3 mm and 4 mm samples ($p > 0.153$).

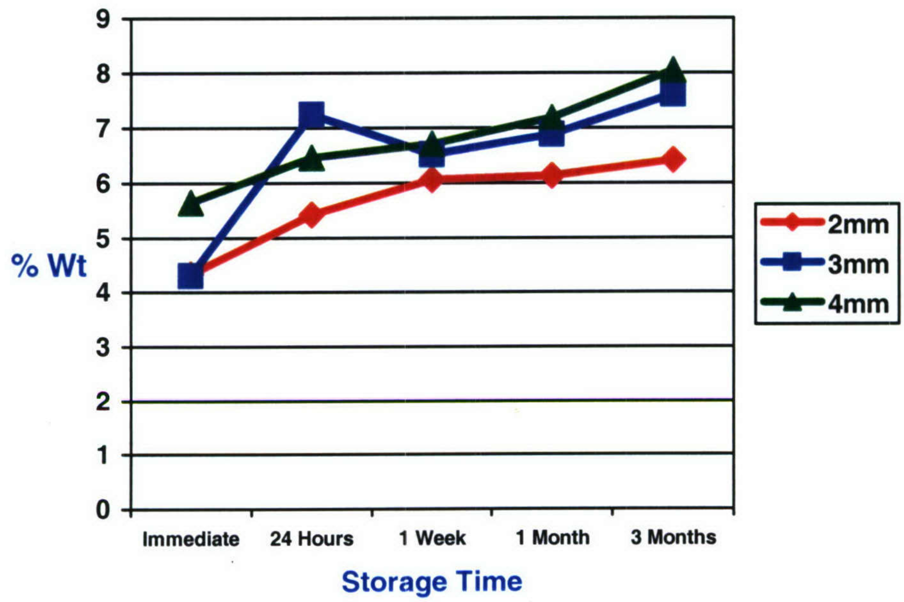
Figure 51. Fuji II LC Thermal Scan Mean Weight Loss (% Wt)



n = 5

The results for the Photac-Fil Quick thermal scan weight loss can be seen in Figure 52.

Figure 52. Photac-Fil Quick Thermal Scan Mean Weight Loss (% Wt)



n = 5

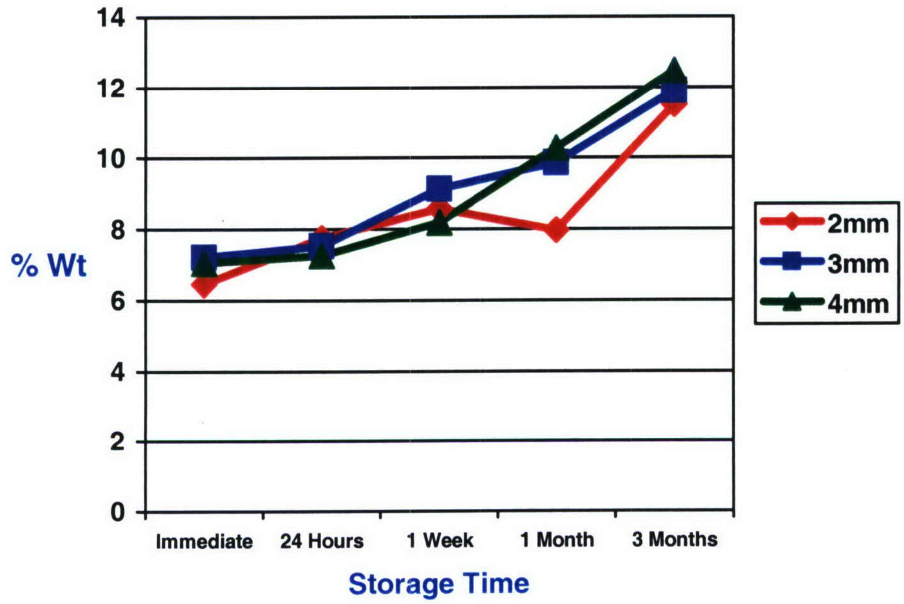
The Photac-Fil Quick samples demonstrated a significantly greater weight loss at the end of the three month storage period as compared to the onset ($p < 0.0001$) with a significant difference in loss identified between the 2 mm and 3 mm samples ($p = 0.017$) and between the 2 mm and 4 mm samples ($p = 0.001$), but not between the 3 mm and 4 mm samples ($p = 0.577$).

All three RMGI materials displayed similar weight loss behavior during the DSC thermal process, demonstrating a significant increase in weight loss as storage time progressed. Interesting, review of the data will show that the 2 mm material samples between one week and one month either show a trend of either weight gain or at least a lessening in the rate of weight loss, but this trend is reversed after one month. As compared to the specific heat determination weight loss, it can be observed that the 2 mm thicknesses display in all materials significantly less weight loss than the 4 mm samples. This trend is the reverse from that observed during the specific heat determinations: a possible explanation can be afforded due to difference in thermal energy provided between the two methods and the development of more firmly-bound water as the RMGI polyalkenoate matrix matures. Accordingly, the enthalpy developed by the

thermal scan is much greater than that provided by specific heat determination and this increased energy could provide the impetus necessary to overcome some of the diffusion barriers that hinders the loss of loosely-bound water during the specific heat determinations. Furthermore, the 4 mm thicknesses could also be susceptible to more weight loss during the thermal scan due to loosely-bound water not removed during the specific heat determinations and the development of bound water as the polyalkenoate matrix matures. Based on some of the evidence provided by hardness testing, the deeper layers do not have the same degree of setting as the upper layers and the polyalkenoate reactions in the deeper layers have either been severely hampered or plasticized by the influx of water during storage. Hence, the polyalkenoate matrix in the deeper regions does not attain the level of maturity required to resist the forces of desiccation and is more prone to water loss.

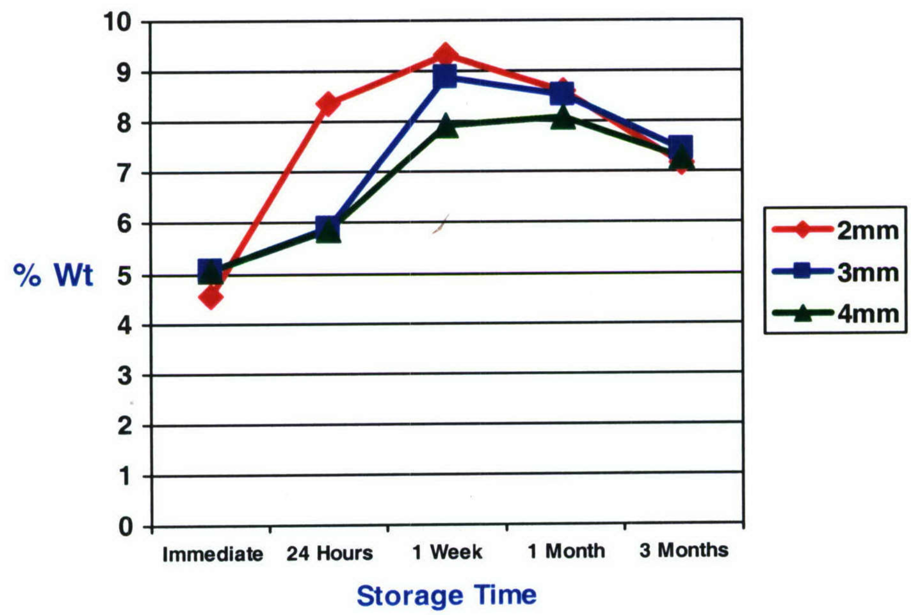
The three resin-modified glass-ionomer materials were additionally analyzed for total weight loss experienced by the samples during the specific heat determinations combined with the DSC thermal scan, and the results for Vitremer can be seen in Figure 53. All of the Vitremer samples experienced significant weight loss between initial fabrication and three months ($p < 0.0001$), but there was no significant difference found between the thicknesses at the end of three months ($p = 0.716$). Interestingly, the results for Fuji II LC and Photac-Fil Quick were similar. All Fuji II LC samples (Figure 54) experienced significant weight loss between immediate fabrication and three months ($p < 0.0001$) but there was no significant difference in total weight loss between the thicknesses at three months ($p = 0.254$). The Photac-Fil Quick samples displayed similar weight loss behavior (Figure 55) demonstrating a significant increase in total weight loss over the total storage time ($p < 0.0001$) but without a significant difference identified between the different thicknesses ($p = 0.548$)

Figure 53. Vitremer Thermal Determinations Mean Total Weight Loss (% Wt)



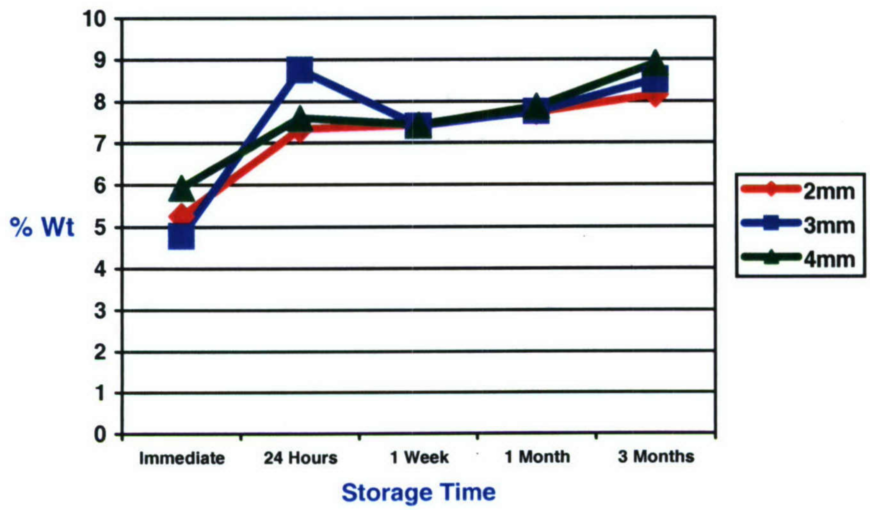
n =5

Figure 54. Fuji II LC Thermal Determinations Mean Total Weight Loss (% Wt)



n = 5

Figure 55. Photac-Fil Quick Thermal Determinations Mean Total Weight Loss (% Wt)



n = 5

The total weight loss data provides some insight into the deposition and maturity of the water that may be contained within each resin-modified glass-ionomer material. The comparison of total weight loss to the thermal scan weight loss data will identify some differences, although in some instances the trends may appear to be similar. One striking difference between the two sets of data is that the thermal scan weight loss should involve only the more firmly-bound water that is incorporated in the polyalkenoate hydrogel. As this hydrogel becomes more mature, less water should theoretically be lost in the resin-modified glass-ionomer materials during the heat capacity determinations while more weight loss due to water could be expected to be lost during the thermal scan. For some cases, this has been found to be exactly the case during this three-month evaluation. However, continued evaluations for longer storage times are needed before definitive trends can be identified.

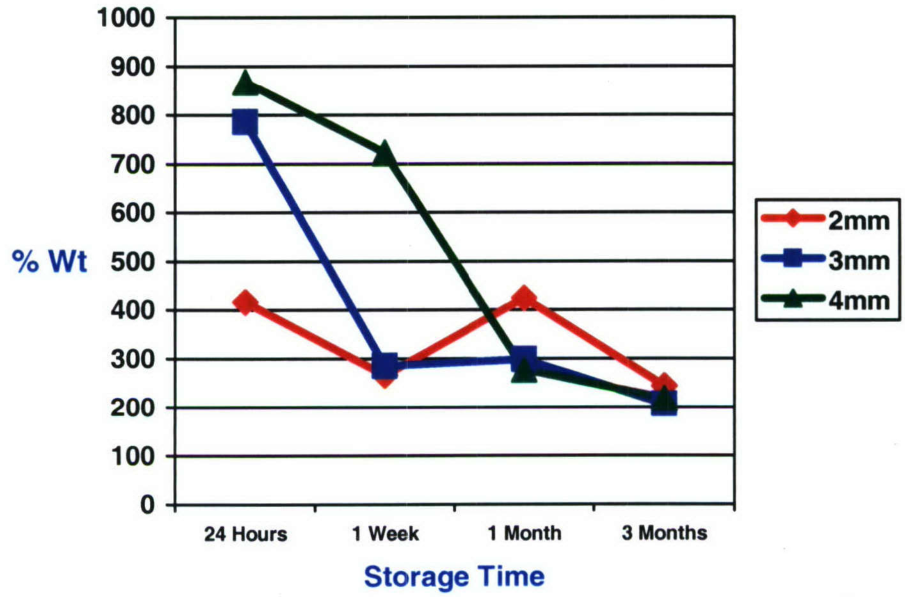
Analysis of the total weight loss of the materials will provide some identity to the nature of the total water behavior of the resin-modified glass-ionomer materials. Due to the maturation processes that occur with glass-ionomer materials in general, it would be expected that overall rate of water loss (as in weight percent loss over time) would decrease as storage time

progressed and the polyalkenoate matrix continues to mature. This behavior was observed at three months with Fuji II LC, Photac-Fil Quick demonstrated a stabilization trend of total weight loss in the evaluation midst, and Vitremer was still demonstrating an increasing weight loss at three months. It cannot be ascertained at present if the present findings will continue to display the same behavior or if the other materials will eventually provide similar total weight loss behavior as demonstrated by Fuji II LC. Further evaluations are ongoing for evaluation of weight loss for increased storage time.

To gain some insight into the effect of water gain during storage to the weight loss during the thermal determinations, the ratios of DSC thermal scan to water gain and total weight loss to water gain (expressed in percent) was analyzed. The immediate groups were excluded from this analysis. The results of the ratio between thermal scan weight loss and water gain for the Vitremer samples is depicted in Figure 56. The ratio of the weight loss during the thermal scans to water gain during storage for the Vitremer samples demonstrated a significant decrease as storage time progressed ($p < 0.0001$). There was no significant difference in the ratio reduction between the 2 mm and 3 mm thicknesses ($p = 0.755$) or between the 3 mm and 4 mm thicknesses ($p = 0.189$). However, a significant difference was identified between the 2 mm and 4 mm thicknesses ($p = 0.042$).

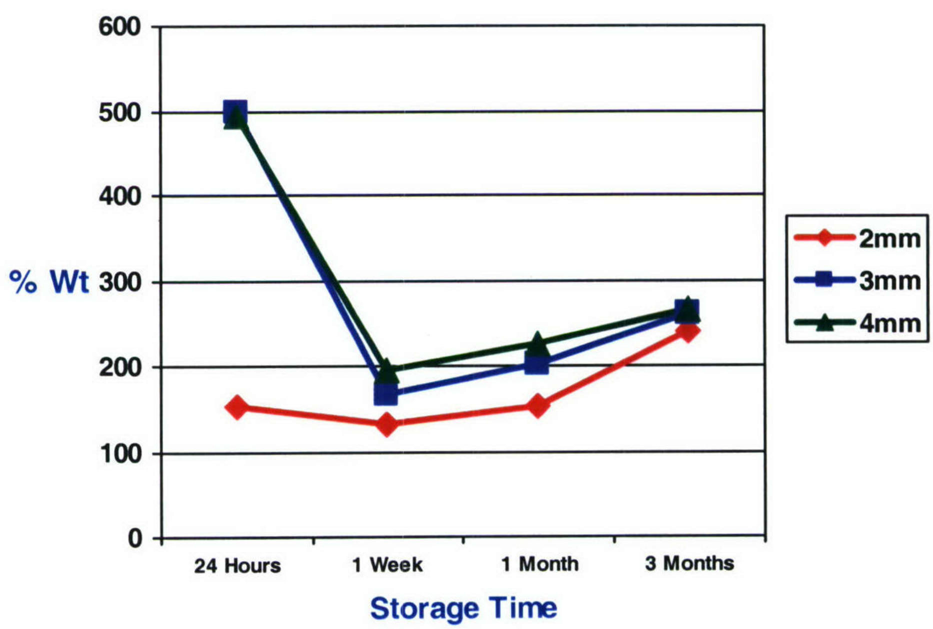
The results of the Fuji II LC ratio of thermal scan weight loss/water gain ratio can be seen in Figure 57.

Figure 56. Vitremer Ratio Mean Thermal Scan Loss/Water Gain (%)



n = 5

Figure 57. Fuji II LC Ratio Mean Thermal Scan Loss/Water Gain (%)

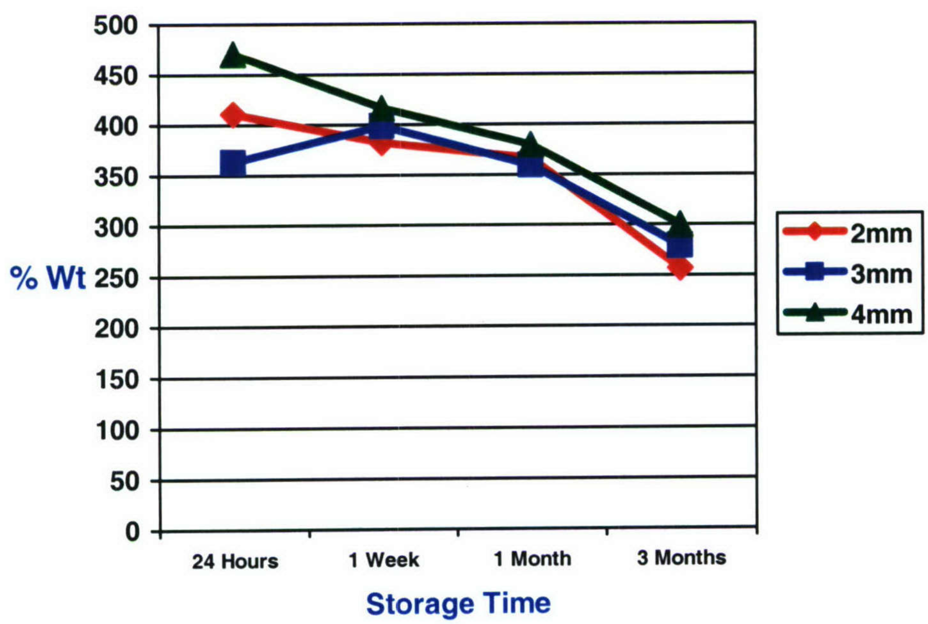


n = 5

One-way ANOVA evaluation of the Fuji II LC ratio of weight loss during the thermal scans to water gain identified a significant change ($p < 0.0001$) within the samples when analyzed over the storage time. However, this was most punctuated by a difference noted between 24 hours and one week as seen by the 3 mm and 4 mm samples that demonstrated a precipitous and significant ($p < 0.0001$) decline in the ratio. However, after this observation there was no significant difference identified within the samples between one week and three months ($p > 0.090$). A significant difference in ratio behavior was noted between the 2 mm and 3 mm ($p = 0.010$) samples as well between the 2 mm and 4 mm samples ($p = 0.004$) but no difference was identified between the 3 mm and 4 mm samples ($p = 0.941$).

The Photac-Fil Quick samples (Figure 58) thermal scan weight loss to water gain ratio displays a decrease in ratio over time, similar to the case of Vitremer. A significant decrease in the overall

Figure 58. Photac-Fil Quick Ratio Mean Thermal Scan Loss/Water Gain (%)

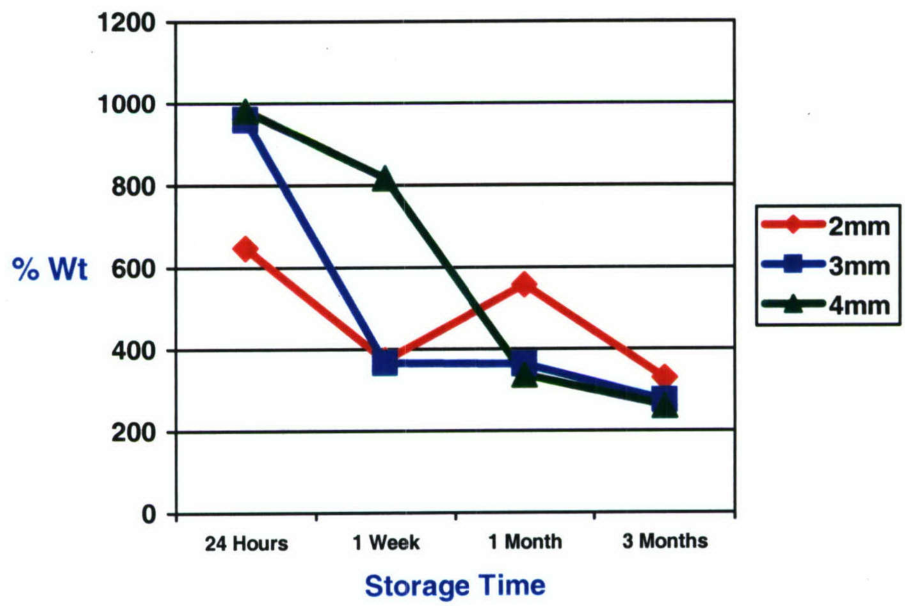


n = 5

ratio was identified between 24 hours and three months ($p = 0.002$), however no significant difference was found between the thicknesses ($p = 0.378$).

An attempt at additional insight into the dynamics of the resin-modified glass-ionomer water behavior was done with evaluating the ratio of total thermal weight loss to water gain during storage. The analysis of Vitremer total thermal weight loss to water gain is graphically depicted in Figure 59. The behavior of this analysis is nearly the same as the thermal scan weight loss and water gain ratio.

Figure 59. Vitremer Ratio Mean Total Thermal Weight Loss/Water Gain (%)



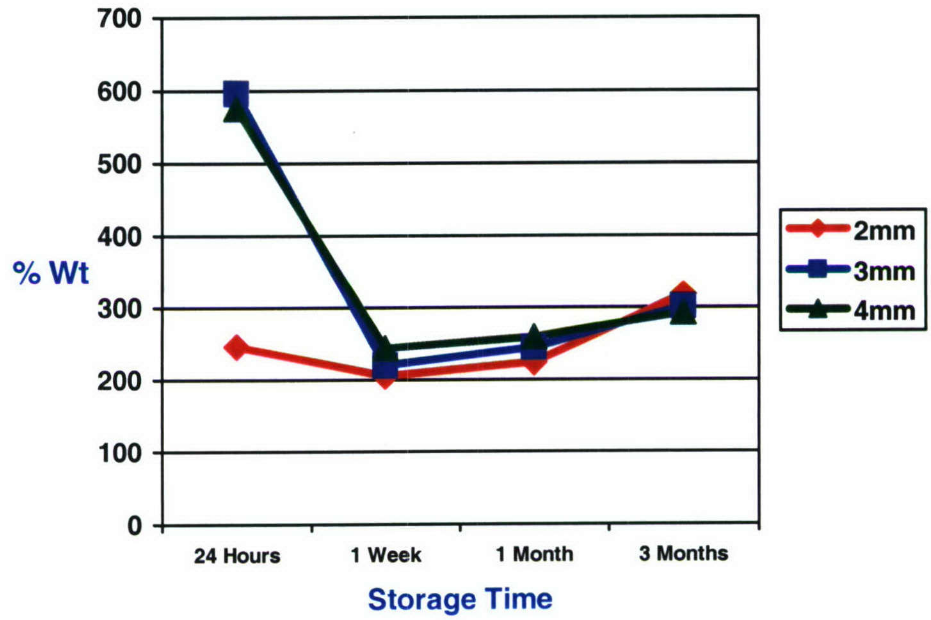
n = 5

As with the ratio of thermal scan weight loss to water gain, all samples demonstrated a significant reduction in the ratio with increased storage time ($p < 0.0001$). However, the total weight loss to water gain ratio differed from the thermal scan to water gain ratio analysis in that ANOVA found no significant difference in the ratio reduction behavior between the sample thicknesses ($p = 0.253$).

Analysis of the Fuji II LC ratio of total thermal weight loss to water gain (Figure 60) found that all samples displayed a significant difference in the ratio between 24 hours and three months storage ($p < 0.0001$) with the main difference noted between 24 hours and the other storage times, as there were no differences found after one week and three months ($p > 0.145$). As with

Vitremer there was no significant difference identified between the Fuji II LC thicknesses ($p > 0.075$).

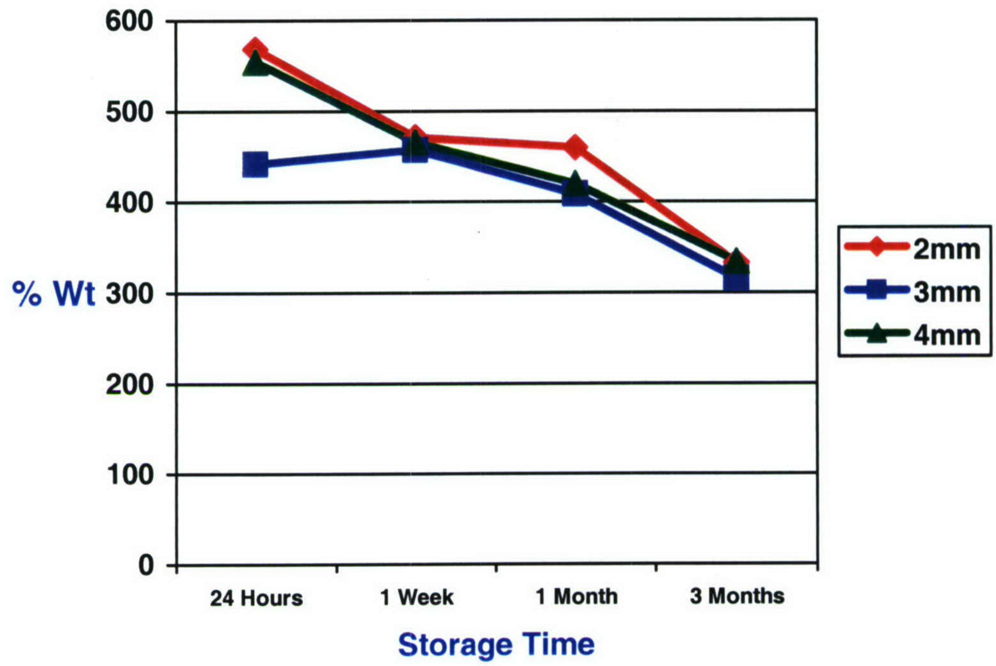
Figure 60. Fuji II LC Ratio Mean Total Thermal Weight Loss/Water Gain (%)



n = 5

As with the thermal scan loss to water gain ratio, the Photac-Fil Quick samples (Figure 61) demonstrated a significant reduction in total thermal weight loss to water gain ratio between 24 hours and three months ($p < 0.0001$, with no significant differences noted between the sample thicknesses ($p = 0.429$).

Figure 61. Photac-Fil Quick Ratio Mean Total Thermal Weight Loss/Water Gain (%)



n = 5

Water is an essential ingredient for all formulations of glass-ionomer materials as water is both a reactant in the early stages of the glass-ionomer setting reaction, but it also enables the formation of the silica-based hydrogel.[93] As glass-ionomer materials mature, a certain water content becomes increasingly resistant to removal by desiccation and is referred to as being more "bound". The ratio to "bound" to "unbound" has been demonstrated to increase as glass-ionomer products mature.[3,21,93] The exact timing of this conversion of the initial unbound water to the more removal-resistant bound water has not been ascertained, as the earliest detection of bound water has not been reported in the scientific literature.

The weight changes associated with thermal analysis of the resin-modified glass-ionomer restorative materials may provide some insight into the nature of water within these materials. If the assumptions of this thesis are correct, results of the net water retention analysis during the specific heat determinations have demonstrated evidence of net water retention as early as 24 hours for Fuji II LC and one week for both Photac-Fil Quick and Vitremer. It is unclear if this

early evidence of water retention is substantiation of the first formation of bound water in resin-modified glass-ionomer cements.

The ratios of weight loss during both the thermal scan and total weight loss to the water gain during storage was undertaken to possibly provide some erudition into relationship between the water gained during storage and the amount of weight loss during the thermal analysis. Another assumption made during the thermal analysis was that weight loss during the higher-temperature thermal scans would predominately be due to the more firmly-bound water species. To assume that the weight loss would entirely be represented by water would be incorrect, as resin-modified glass-ionomer materials represent complex solutions of both polyalkenoate and methacrylate components, as well as photointiators and other modifiers.[21] Some weight loss during the thermal scan with Fuji II LC and Photac-Fil Quick could be also attributed to unreacted methacrylate components, especially HEMA. However, due to the water-soluble nature of HEMA, it could be reasonable to assume that any unreacted HEMA remaining in the matrix might exist in solution with water during the thermal scan process. Since the methacrylate component is largely grafted upon the polyacrylic acid backbone in Vitremer, it is comfortable to assume that weight loss during the thermal scan could be more due to water loss than the other two materials. However, the reader must be reminded that these simplistic generalizations are made in order to attempt to observe generalized trends of the materials: the emphasis remains that these materials are complex entities and not mere simple mixtures of polyalkenoate components and methacrylates.

All materials demonstrated increased weight loss during the DSC thermal scan as storage time increased. This behavior is expected as all materials were demonstrated to gain weight during storage. Division of the weight loss during the DSC thermal scan by the observed water gain during storage provides some insight into the nature of the water into these materials at the time of the thermal scan. Accordingly, the RMGI materials certainly contain both unbound and bound water in their matrix: but by the time the samples were submitted to the thermal scan a

considerable component of the unbound water has been removed by the specific heat determination. This concept perhaps lends better credence to comparing total weight loss to the water gain during storage.

All three materials demonstrated, with few exceptions, an overall loss in the ratio of thermal total weight loss to water gain with storage time. If the content of RMGI materials are considered, the materials will consist on the outset a mixture of aluminofluorosilicate glasses, polyacrylic acid polymers, methacrylate monomers, water, photointiators, and a variety of other proprietary resin components. After preparation the material will contain, depending on its maturity, a mixture of methacrylate polymers, siliceous hydrogel matrix, and unreacted aluminoflurorsilicate glasses, polyacrylic acid polymers, and unreacted methacrylate components. Concerning the weight loss observed during the thermal scans, it is felt that any unreacted methacrylate components that are not grafted onto the polyacrylic acid polymer backbone may be removed during the thermal scan. However, loss of unreacted polyacrylic acid components contribution to weight loss during the thermal scan is considered minor as most polyacrylic acids used in the RMGI component demonstrate boiling points in excess of 200 °C and thermal endothermic peaks associated with this phase change was not apparent during the thermal scans. It is felt that probably that the major contributor to the weight loss during the DSC thermal scan is due to water loss, which may be accompanied by other minor components that may be concurrently in solution with the water at the time. As storage time progressed, the ratio of total weight loss during the thermal determinations to water gain decreased in all materials. This represents the transformation of the water that is gained from the unbound to the more stable bound nature in the mature hydrogel matrix.

CONCLUSIONS

Based on the conditions of this study, several encompassing summary statements may be made:

1. The solubility data reveals interesting material trends concerning resin-modified glass-ionomer restorative materials. All three materials demonstrated increased solubility until the one-month storage period. This reflects a continuation of the ongoing ion-exchange process of the polyalkenoate reaction and that resin-modified glass-ionomer materials may be more susceptible to the effects of solution until that time. Furthermore, solubility measurement, especially under the conditions of this study, does not provide sufficient sensitivity to provide meaningful data in the determination of resin-modified glass-ionomer depth of cure.
2. The analysis of the hardness data provided evidence of a continuing post-irradiation polyalkenoate reaction. Although hardness increase was noted in deeper layers of all materials, the increase in the 4 mm and 5 mm bottom surfaces was not of sufficient magnitude to reach statistical equivalence with the hardness exhibited by the 2 mm surfaces. At the end of three months, only Fuji II LC demonstrated a bottom surface hardness of the 3 mm samples that were statistically similar to the hardness exhibited by the 2 mm samples.
3. All materials evidenced an increase in specific heat capacity with material aging. This is suspected to be due to increased water uptake and retention, which is strong evidence of the continuation of a post-irradiation polyalkenoate reaction. At the end of the three-month storage there were no significant differences in the specific heat between the 2 mm and 3 mm thicknesses of materials. There remained significant differences between the 2 mm and 4 mm thicknesses in two of the three RMGI materials.
4. All materials exhibited evidence during the differential scanning calorimetry thermal scans that demonstrated a change in material compositional nature with storage time. Each material demonstrated different behavior in the thermal scan in regard to energy requirements and tendencies towards stabilization of the thermal energy requirements

with increased storage time. Each material demonstrated mean thermal scan peak temperature behavior that also provides evidence that the material compositional change within each material is becoming more similar in nature.

5. Analysis of weight loss during the specific heat determinations identified evidence of the first events of net water retention with the resin-modified glass-ionomer materials. This suggests that the first evidence of bound water in Fuji II LC is at 24 hours and at one week with both Photac-Fil Quick and Vitremer.
6. Analysis of thermal determinations weight loss compared to water gain revealed that the resin-modified glass-ionomer materials demonstrated water-retentive behavior in the form of unbound and bound water as that reported by conventional glass-ionomer materials.

The purpose of this investigation was to characterize the depth of cure of resin-modified glass-ionomer restorative materials using physical property testing with the research hypothesis that RMGI materials will display a depth of cure gradient that is more dependent on visible light penetration rather than what residual acid-base chemical setting reaction that may remain. Based on the analysis of the data that was collected under the conditions of this study the research hypothesis is accepted.

Information gained from the hardness testing and thermal analysis did give evidence of a continuing post-photopolymerization reaction, which is certainly indicative of the acid-base polyalkenoate setting reaction. However, the nature of this reaction, especially in the deeper 4 mm and 5 mm depths, did not provide sufficient change in physical properties as to be statistically equivalent to the 2 mm depths. There were instances in which material properties at the 3 mm depth was equivalent to that seen of 2 mm depths, however this was not consistently seen within all materials during all storage times. It is the conclusion from the conditions of this study that for best material properties resin-modified glass-ionomer restorative products should be photopolymerized in thicknesses of no more than two millimeters.

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APPENDIX A

SOLUBILITY DATA

Table 64. Vitremer Immediate Solubility Experimental Sample Results (grams)

Vitremer Immediate	SOLUBILITY (EXPERIMENTAL GROUP)														
		O'Haus Analytical Plus Scale						pre H2O	post H2O						
2mm Group								13-Jan-06	14-Jan-06	15-Jan-06	17-Jan-06	18-Jan-06	19-Jan-06	20-Jan-06	21-Jan-06
Sample	1	2	3	4	5		1	0.2155	0.2238	0.2082	0.207	0.2064	0.2062	0.2061	0.2064
Start weight	0.2155	0.2324	0.2169	0.2162	0.2268	Floss total	2	0.2324	0.2425	0.2259	0.2245	0.2241	0.2236	0.2235	0.2239
Floss Weight	0.0111	0.0103	0.0106	0.01	0.0104	0.0524	3	0.2169	0.261	0.2099	0.2085	0.2079	0.2078	0.2076	0.2078
W1 (start-floss)	0.2044	0.2221	0.2063	0.2062	0.2164		4	0.2162	0.2249	0.2098	0.2086	0.2081	0.208	0.207	0.208
Final constant weight	0.2064	0.2239	0.2078	0.208	0.2175		5	0.2268	0.2355	0.2196	0.2182	0.2176	0.2173	0.2174	0.2175
Floss Weight	0.0111	0.0103	0.0106	0.01	0.0104		Wt-floss	1.0554	1.1353	1.021	1.0144	1.0117	1.0105	1.0092	1.0112
W2 (final-floss)	0.1953	0.2136	0.1972	0.198	0.2071		Mean	0.21108	0.22706	0.2042	0.20288	0.20234	0.2021	0.20184	0.20224
							sd	0.007618	0.015229	0.007726	0.007653	0.00771	0.007554	0.007747	0.007653
% SOLUBILITY	4.452055	3.827105	4.411052	3.976722	4.297597			Mean solubility		4.192906	0.2767				
3mm Group															
Sample	1	2	3	4	5		1	0.288	0.2987	0.2773	0.2754	0.2747	0.2746		
Start weight	0.288	0.2723	0.2763	0.2697	0.2804	Floss total	2	0.2723	0.2832	0.2632	0.2614	0.2604	0.2602		
Floss Weight	0.0101	0.0089	0.0102	0.0088	0.0095	0.0475	3	0.2763	0.2869	0.267	0.2651	0.2643	0.2641		
W1 (start-floss)	0.2779	0.2634	0.2661	0.2609	0.2709		4	0.2697	0.2823	0.2587	0.2569	0.2559	0.2556		
Final constant weight	0.2746	0.2602	0.2641	0.2556	0.2693		5	0.2804	0.2905	0.2721	0.2703	0.2692	0.2693		
Floss Weight	0.0101	0.0089	0.0102	0.0088	0.0095		Wt - floss	1.3392	1.3941	1.2908	1.2816	1.277	1.2763	-0.0475	
W2 (final-floss)	0.2645	0.2513	0.2539	0.2468	0.2598		Mean	0.26784	0.27882	0.25816	0.25632	0.2554	0.25526	-0.0095	
							sd	0.007209	0.006651	0.007302	0.007271	0.007351	0.007459	#DIV/0!	
% SOLUBILITY	4.821878	4.593774	4.584743	5.404369	4.097453			Mean solubility		4.700443	0.473978				
4mm Group															
Sample	1	2	3	4	5		1	0.3254	0.3408	0.3106	0.3074	0.3062	0.3062	0.3057	0.3059
Start weight	0.3254	0.3788	0.3765	0.3623	0.4152	Floss total	2	0.3788	0.3912	0.3618	0.358	0.3567	0.3564	0.3563	0.3565
Floss Weight	0.0109	0.01	0.0098	0.0087	0	0.0394	3	0.3765	0.39	0.3553	0.3518	0.3499	0.3493	0.3493	0.3498
W1 (start-floss)	0.3145	0.3688	0.3667	0.3536	0.4152		4	0.3623	3752	0.3406	0.3368	0.3353	0.3347	0.3344	0.3348
Final constant weight	0.3059	0.3565	0.3498	0.3348	0.3707		5	0.4152	0.4122	0.3795	0.3738	0.3716	0.3709	0.3703	0.3707
Floss Weight	0.0109	0.01	0.0098	0.0087	0		Wt-floss	1.8188	3753.495	1.7084	1.6884	1.6803	1.6781	1.6766	1.6783
W2 (final-floss)	0.295	0.3465	0.34	0.3261	0.3707		Mean	0.36376	750.699	0.34168	0.33768	0.33606	0.33562	0.33532	0.33566
							sd	0.032395	1677.774	0.025871	0.02512	0.024811	0.024594	0.024632	0.024688
% SOLUBILITY	6.200318	6.046638	7.281156	7.777149	10.71773			Mean solubility		7.604598	1.885815				
5mm Group															
Sample	1	2	3	4	5		1	0.4481	0.4624	0.4297	0.4265	0.4251	0.4249	0.4247	0.4251
Start weight	0.4481	0.4145	0.4833	0.5052	0.4921	Floss total	2	0.4145	0.4305	0.3979	0.395	0.3938	0.3928	0.4433	0.3931
Floss Weight	0.0107	0.0097	0.0094	0.0089	0.0099	0.0486	3	0.4833	0.4966	0.464	0.4603	0.4589	0.4579	0.4847	0.4581
W1 (start-floss)	0.4374	0.4048	0.4739	0.4963	0.4822		4	0.5052	0.5181	0.4834	0.4792	0.4778	0.4768	0.4664	0.477
Final constant weight	0.4251	0.3931	0.4581	0.477	0.4643		5	0.4921	0.5017	0.471	0.4668	0.4654	0.4642	0.4796	0.4643
Floss Weight	0.0107	0.0097	0.0094	0.0089	0.0099		Wt-floss	2.2946	2.3607	2.1974	2.1792	2.1724	2.168	2.2501	2.169
W2 (final-floss)	0.4144	0.3834	0.4487	0.4681	0.4544		Mean	0.45892	0.47214	0.43948	0.43584	0.43448	0.4336	0.45002	0.4338
							sd	0.036929	0.035145	0.034914	0.03435	0.034276	0.034136	0.025297	0.034084
% SOLUBILITY	5.258345	5.286561	5.317578	5.682047	5.765243			Mean solubility		5.461955	0.241603				

Table 65. Vitremer Immediate Solubility Results Control Sample Results (grams)

Vitremer Immediate SOLUBILITY (Control GROUP)														
START: 12 Dec 2005		O'Haus Analytical Plus Scale						pre H2O	post H2O					
2mm Group								12-Dec-05	13-Dec-05	14-Dec-05	15-Dec-05	16-Dec-05	17-Dec-05	18-Dec-05
Sample	1	2	3	4	5		1	0.2333	0.2395	0.2273	0.2259	0.2258	0.2252	
Start weight	0.2333	0.2177	0.2151	0.2352	0.2373	Floss total	2	0.2177	0.225	0.2109	0.2098	0.2094	0.209	
Floss Weight	0.0125	0.0125	0.0098	0.0113	0.0125	0.0586	3	0.2151	0.2216	0.2081	0.2072	0.2066	0.2062	
W1 (start-floss)	0.2208	0.2052	0.2053	0.2239	0.2248		4	0.2352	0.242	0.2293	0.228	0.2275	0.2271	
Final constant weight	0.2252	0.209	0.2062	0.2271	0.229		5	0.2373	0.2434	0.2312	0.2299	0.2297	0.229	
Floss Weight	0.0125	0.0125	0.0098	0.0113	0.0125		Wt-floss	1.08	1.1129	1.0482	1.0422	1.0404	1.0379	
W2 (final-floss)	0.2127	0.1965	0.1964	0.2158	0.2165		Mean	0.216	0.22258	0.20964	0.20844	0.20808	0.20758	
							sd	0.01047053	0.01020931	0.01095892	0.01077697	0.01090527	0.01081018	
% SOLUBILITY	3.67	4.24	4.34	3.62	3.69			Mean solubility		3.91	0.35			
3mm Group														
Sample	1	2	3	4	5		1	0.276	0.2848	0.2673	0.2658	0.2653	0.2647	0.2647
Start weight	0.276	0.269	0.3235	0.3047	0.2863	Floss total	2	0.269	0.2783	0.2594	0.2579	0.2575	0.2567	0.2567
Floss Weight	0.0104	0.0108	0.0097	0.0087	0.011	0.0506	3	0.3235	0.3321	0.3139	0.3121	0.3115	0.3108	0.3108
W1 (start-floss)	0.2656	0.2582	0.3138	0.296	0.2753		4	0.3047	0.3144	0.2943	0.2923	0.2914	0.2906	0.2906
Final constant weight	0.2647	0.2567	0.3108	0.2936	0.2738		5	0.2863	0.2959	0.2767	0.275	0.2745	0.2737	0.2738
Floss Weight	0.0104	0.0108	0.0097	0.0087	0.011		Wt - floss	1.4089	1.4549	1.361	1.3525	1.3496	1.3459	1.346
W2 (final-floss)	0.2543	0.2459	0.3011	0.2849	0.2628		Mean	0.28178	0.29098	0.2722	0.2705	0.26992	0.26918	0.2692
							sd	0.02219786	0.02208201	0.02192788	0.02176481	0.02164943	0.02165191	0.02164548
% SOLUBILITY	4.25	4.76	4.05	3.75	4.54			Mean solubility		4.27	0.40			
4mm Group														
Sample	1	2	3	4	5		1	0.363	0.3746	0.3493	0.3466	0.3463	0.3451	0.3451
Start weight	0.363	0.381	0.3954	0.3847	0.3483	Floss total	2	0.381	0.3923	0.3674	0.3649	0.3642	0.3631	0.3632
Floss Weight	0.01	0.0109	0.0093	0.0111	0.009	0.0503	3	0.3954	0.4059	0.3809	0.3779	0.3773	0.3763	0.3763
W1 (start-floss)	0.353	0.3701	0.3861	0.3736	0.3393		4	0.3847	0.396	0.3698	0.3666	0.3663	0.3652	0.3653
Final constant weight	0.3451	0.3632	0.3763	0.3653	0.3306		5	0.3483	0.3592	0.3353	0.3323	0.3316	0.3306	0.3306
Floss Weight	0.01	0.0109	0.0093	0.0111	0.009		Wt-floss	1.8221	1.8777	1.7524	1.738	1.7354	1.73	1.7302
W2 (final-floss)	0.3351	0.3523	0.367	0.3542	0.3216		Mean	0.36442	0.37554	0.35048	0.3476	0.34708	0.346	0.34604
							sd	0.01872023	0.01859503	0.01810202	0.01807935	0.01809677	0.0181045	0.01812691
% SOLUBILITY	5.07	4.81	4.95	5.19	5.22			Mean solubility		5.05	0.17			
5mm Group														
Sample	1	2	3	4	5		1	0.4839	0.4961	0.4658	0.4625	0.4617	0.4604	0.4604
Start weight	0.4839	0.4664	0.507	0.4893	0.5015	Floss total	2	0.4664	0.481	0.4489	0.4456	0.4446	0.4434	0.4433
Floss Weight	0.0125	0.0109	0.0101	0.0102	0.011	0.0547	3	0.507	0.5182	0.4903	0.4871	0.4861	0.4848	0.4847
W1 (start-floss)	0.4714	0.4555	0.4969	0.4791	0.4905		4	0.4893	0.5014	0.4719	0.4685	0.4676	0.4664	0.4664
Final constant weight	0.4604	0.4433	0.4847	0.4664	0.4796		5	0.5015	0.5136	0.4851	0.4813	0.4809	0.4799	0.4796
Floss Weight	0.0125	0.0109	0.0101	0.0102	0.011		Wt-floss	2.3934	2.4556	2.3073	2.2903	2.2862	2.2802	2.2797
W2 (final-floss)	0.4479	0.4324	0.4746	0.4562	0.4686		Mean	0.47868	0.49112	0.46146	0.45806	0.45724	0.45604	0.45594
							sd	0.01593101	0.01477457	0.01641463	0.01634748	0.01644132	0.01646305	0.01641332
% SOLUBILITY	4.99	5.07	4.49	4.78	4.46			Mean solubility		4.76	0.28			

Table 66. Vitremer 24-Hour Solubility Results Experimental Sample Results (grams)

Vitremer II 24-HR SOLUBILITY (EXPERIMENTAL GROUP)														
	O'Haus Analytical Plus Scale							pre H2O	post H2O					
2mm Group								25-Jan-06	26-Jan-06	27-Jan-06	28-Jan-06	29-Jan-06	30-Jan-06	31-Jan-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2094	0.2116	0.1985	0.1979	0.1978		
Start weight	0.2094	0.2271	0.2214	0.2245	0.2416	Floss total	2	0.2271	0.2296	0.2171	0.2168	0.2167		
Floss Weight	0.0096	0.0092	0.0107	0.0094	0.0121	0.051	3	0.2214	0.2239	0.2104	0.2099	0.2098		
W1 (start-floss)	0.1998	0.2179	0.2107	0.2151	0.2295		4	0.2245	0.2267	0.2131	0.2125	0.2125		
Final constant weight	0.1978	0.2167	0.2098	0.2125	0.2273		5	0.2416	0.2434	0.2279	0.2273	0.2273		
Floss Weight	0.0096	0.0092	0.0107	0.0094	0.0121		**Wt-floss**	1.073	1.0842	1.016	1.0134	1.0131		
W2 (final-floss)	0.1882	0.2075	0.1991	0.2031	0.2152		**Mean**	0.2146	0.21684	0.2032	0.20268	0.20262		
							sd	0.0115795	0.0114299	0.0106658	0.0106856	0.0107185		
% SOLUBILITY	5.81	4.77	5.51	5.58	6.23			**Mean solubility**		5.58	0.53			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3127	0.3185	0.2974	0.2963	0.2961		
Start weight	0.3127	0.316	0.2836	0.2691	0.3099	Floss total	2	0.316	0.322	0.3017	0.3007	0.3004		
Floss Weight	0.011	0.0102	0	0.0099	0.0098	0.0409	3	0.2836	0.2909	0.2681	0.2672	0.267		
W1 (start-floss)	0.3017	0.3058	0.2836	0.2592	0.3001		4	0.2691	0.2759	0.2551	0.2544	0.2542		
Final constant weight	0.2961	0.3004	0.267	0.2542	0.2947		5	0.3099	0.3156	0.2957	0.2948	0.2947		
Floss Weight	0.011	0.0102	0	0.0099	0.0098		**Wt - floss**	1.4504	1.482	1.3771	1.3725	1.3715		
W2 (final-floss)	0.2851	0.2902	0.267	0.2443	0.2849		**Mean**	0.29008	0.2964	0.27542	0.2745	0.2743		
							sd	0.0207601	0.0201764	0.0207181	0.0205943	0.0205873		
% SOLUBILITY	5.50	5.10	5.85	5.75	5.06			**Mean solubility**		5.45	0.36			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4022	0.4105	0.3818	0.3804	0.3796	0.3791	0.3795
Start weight	0.4022	0.3973	0.39	0.3961	0.3823	Floss total	2	0.3973	0.4035	0.3782	0.3771	0.3765	0.3758	0.3762
Floss Weight	0.0107	0.012	0.0101	0.0099	0.0109	0.0536	3	0.39	0.3975	0.3692	0.3677	0.3672	0.3662	0.3668
W1 (start-floss)	0.3915	0.3853	0.3799	0.3862	0.3714		4	0.3961	0.4038	0.3747	0.3734	0.3728	0.3722	0.3724
Final constant weight	0.3795	0.3762	0.3668	0.3724	0.3622		5	0.3823	0.3901	0.3639	0.3629	0.3624	0.3617	0.3622
Floss Weight	0.0107	0.012	0.0101	0.0099	0.0109		**Wt-floss**	1.9143	1.9518	1.8142	1.8079	1.8049	1.8014	1.8035
W2 (final-floss)	0.3688	0.3642	0.3567	0.3625	0.3513		**Mean**	0.38286	0.39036	0.36284	0.36158	0.36098	0.36028	0.3607
							sd	0.0076575	0.0076709	0.0071248	0.0070601	0.0069534	0.0070643	0.0069901
% SOLUBILITY	5.80	5.48	6.11	6.14	5.41			**Mean solubility**		5.79	0.34			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5015	0.5083	0.4813	0.4792	0.4784	0.4774	0.4781
Start weight	0.5015	0.5052	0.4808	0.5022	0.5121	Floss total	2	0.5052	0.5098	0.4854	0.4839	0.4831	0.4825	0.4829
Floss Weight	0.011	0.0111	0.0112	0.0112	0.0101	0.0546	3	0.4808	0.4871	0.4611	0.4601	0.459	0.4586	0.4592
W1 (start-floss)	0.4905	0.4941	0.4696	0.491	0.502		4	0.5022	0.5084	0.4801	0.4783	0.4776	0.477	0.4773
Final constant weight	0.4781	0.4829	0.4592	0.4773	0.4861		5	0.5121	0.5182	0.4892	0.4876	0.4866	0.4859	0.4861
Floss Weight	0.011	0.0111	0.0112	0.0112	0.0101		**Wt-floss**	2.4472	2.4772	2.3425	2.3345	2.3301	2.3268	2.329
W2 (final-floss)	0.4671	0.4718	0.448	0.4661	0.476		**Mean**	0.48944	0.49544	0.4685	0.4669	0.46602	0.46536	0.4658
							sd	0.0117104	0.0115205	0.0108516	0.0105918	0.0106732	0.0105545	0.0104327
% SOLUBILITY	4.77	4.51	4.60	5.07	5.18			**Mean solubility**		4.83	0.29			

Table 67. Vitremer 24-Hour Solubility Results Control Sample Results (grams)

Vitremer II 24-HR SOLUBILITY (CONTROL GROUP)														
	O'Haus Analytical Plus Scale							pre H2O	post H2O					
2mm Group								21-Jan-06	22-Jan-06	23-Jan-06	24-Jan-06	25-Jan-06	26-Jan-06	27-Jan-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2085	0.2107	0.1988	0.1971	0.1971		
Start weight	0.2085	0.2213	0.2317	0.2236	0.2436	Floss total	2	0.2213	0.2237	0.2118	0.2094	0.2091		
Floss Weight	0.0107	0.012	0.0115	0.012	0.0117	0.0579	3	0.2317	0.2348	0.2224	0.2204	0.2201		
W1 (start-floss)	0.1978	0.2093	0.2202	0.2116	0.2319		4	0.2236	0.2269	0.2129	0.2107	0.2109		
Final constant weight	0.1971	0.2091	0.2201	0.2109	0.2306		5	0.2436	0.2463	0.2334	0.2307	0.2306		
Floss Weight	0.0107	0.012	0.0115	0.012	0.0117		**Wt-floss**	1.0708	1.0845	1.0214	1.0104	1.0099		
W2 (final-floss)	0.1864	0.1971	0.2086	0.1989	0.2189		**Mean**	0.21416	0.2169	0.20428	0.20208	0.20198		
							sd	0.013	0.013219	0.01291	0.012619	0.01256		
% SOLUBILITY	5.76	5.83	5.27	6.00	5.61			**Mean solubility**		5.69	0.28			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.297	0.3044	0.2844	0.2819	0.2806		
Start weight	0.297	0.2968	0.2656	0.2686	0.2855	Floss total	2	0.2968	0.3032	0.2854	0.2821	0.282		
Floss Weight	0.0124	0.0108	0.0115	0.0104	0.0119	0.057	3	0.2656	0.2713	0.2553	0.2528	0.2523		
W1 (start-floss)	0.2846	0.286	0.2541	0.2582	0.2736		4	0.2686	0.276	0.2553	0.2522	0.252		
Final constant weight	0.2806	0.282	0.2523	0.252	0.2701		5	0.2855	0.2919	0.2734	0.2705	0.2701		
Floss Weight	0.0124	0.0108	0.0115	0.0104	0.0119		**Wt - floss**	1.3565	1.3898	1.2968	1.2825	1.28		
W2 (final-floss)	0.2682	0.2712	0.2408	0.2416	0.2582		**Mean**	0.2713	0.27796	0.25936	0.2565	0.256		
							sd	0.01502	0.015239	0.014878	0.014823	0.014662		
% SOLUBILITY	5.76	5.17	5.23	6.43	5.63			**Mean solubility**		5.65	0.50			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3631	0.3798	0.3483	0.3447	0.3437	0.3433	0.3432
Start weight	0.3631	0.4162	0.412	0.4313	0.4301	Floss total	2	0.4162	0.4209	0.4007	0.3965	0.3953	0.3948	0.3946
Floss Weight	0.012	0.0112	0	0.0126	0.0118	0.0476	3	0.412	0.4177	0.3984	0.3943	0.3933	0.3928	0.3926
W1 (start-floss)	0.3511	0.405	0.412	0.4187	0.4183		4	0.4313	0.4362	0.4159	0.4123	0.4113	0.4107	0.4105
Final constant weight	0.3432	0.3946	0.3926	0.4105	0.4111		5	0.4301	0.4352	0.4167	0.4129	0.4118	0.4112	0.4111
Floss Weight	0.012	0.0112	0	0.0126	0.0118		**Wt-floss**	2.0051	2.0422	1.9324	1.9131	1.9078	1.9052	1.9044
W2 (final-floss)	0.3312	0.3834	0.3926	0.3979	0.3993		**Mean**	0.40102	0.40844	0.38648	0.38262	0.38156	0.38104	0.38088
							sd	0.027831	0.022885	0.027963	0.027891	0.027865	0.027785	0.027762
% SOLUBILITY	5.67	5.33	4.71	4.97	4.54			**Mean solubility**		5.04	0.46			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5098	0.5156	0.4948	0.489	0.4879	0.4873	0.4871
Start weight	0.5098	0.5004	0.4859	0.4903	0.5003	Floss total	2	0.5004	0.5056	0.4829	0.478	0.4773	0.4776	0.477
Floss Weight	0.0101	0.0105	0.0098	0.0107	0.011	0.0521	3	0.4859	0.4918	0.4705	0.4651	0.4643	0.4633	0.463
W1 (start-floss)	0.4997	0.4899	0.4761	0.4796	0.4893		4	0.4903	0.4966	0.4743	0.4691	0.4685	0.4677	0.4673
Final constant weight	0.4871	0.477	0.463	0.4673	0.4742		5	0.5003	0.5064	0.4824	0.4764	0.4755	0.4744	0.4742
Floss Weight	0.0101	0.0105	0.0098	0.0107	0.011		**Wt-floss**	2.4346	2.4639	2.3528	2.3255	2.3214	2.3182	2.3165
W2 (final-floss)	0.477	0.4665	0.4532	0.4566	0.4632		**Mean**	0.48692	0.49278	0.47056	0.4651	0.46428	0.46364	0.4633
							sd	0.009405	0.009264	0.009369	0.009198	0.009059	0.009276	0.009303
% SOLUBILITY	4.54	4.78	4.81	4.80	5.33			**Mean solubility**		4.85	0.29			

Table 68. Vitremer One-Week Solubility Results Experimental Sample Results (grams)

Vitremer II 24-HR SOLUBILITY (CONTROL GROUP)														
		O'Haus Analytical Plus Scale						pre H2O	post H2O					
2mm Group								21-Jan-06	22-Jan-06	23-Jan-06	24-Jan-06	25-Jan-06	26-Jan-06	27-Jan-06
Sample	1	2	3	4	5		1	0.2085	0.2107	0.1988	0.1971	0.1971		
Start weight	0.2085	0.2213	0.2317	0.2236	0.2436	Floss total	2	0.2213	0.2237	0.2118	0.2094	0.2091		
Floss Weight	0.0107	0.012	0.0115	0.012	0.0117	0.0579	3	0.2317	0.2348	0.2224	0.2204	0.2201		
W1 (start-floss)	0.1978	0.2093	0.2202	0.2116	0.2319		4	0.2236	0.2269	0.2129	0.2107	0.2109		
Final constant weight	0.1971	0.2091	0.2201	0.2109	0.2306		5	0.2436	0.2463	0.2334	0.2307	0.2306		
Floss Weight	0.0107	0.012	0.0115	0.012	0.0117		**Wt-floss**	1.0708	1.0845	1.0214	1.0104	1.0099		
W2 (final-floss)	0.1864	0.1971	0.2086	0.1989	0.2189		**Mean**	0.21416	0.2169	0.20428	0.20208	0.20198		
							sd	0.013	0.013219	0.01291	0.012619	0.01256		
% SOLUBILITY	5.76	5.83	5.27	6.00	5.61			**Mean solubility**		5.69	0.28			
3mm Group														
Sample	1	2	3	4	5		1	0.297	0.3044	0.2844	0.2819	0.2806		
Start weight	0.297	0.2968	0.2656	0.2686	0.2855	Floss total	2	0.2968	0.3032	0.2854	0.2821	0.282		
Floss Weight	0.0124	0.0108	0.0115	0.0104	0.0119	0.057	3	0.2656	0.2713	0.2553	0.2528	0.2523		
W1 (start-floss)	0.2846	0.286	0.2541	0.2582	0.2736		4	0.2686	0.276	0.2553	0.2522	0.252		
Final constant weight	0.2806	0.282	0.2523	0.252	0.2701		5	0.2855	0.2919	0.2734	0.2705	0.2701		
Floss Weight	0.0124	0.0108	0.0115	0.0104	0.0119		**Wt - floss**	1.3565	1.3898	1.2968	1.2825	1.28		
W2 (final-floss)	0.2682	0.2712	0.2408	0.2416	0.2582		**Mean**	0.2713	0.27796	0.25936	0.2565	0.256		
							sd	0.01502	0.015239	0.014878	0.014823	0.014662		
% SOLUBILITY	5.76	5.17	5.23	6.43	5.63			**Mean solubility**		5.65	0.50			
4mm Group														
Sample	1	2	3	4	5		1	0.3631	0.3798	0.3483	0.3447	0.3437	0.3433	0.3432
Start weight	0.3631	0.4162	0.412	0.4313	0.4301	Floss total	2	0.4162	0.4209	0.4007	0.3965	0.3953	0.3948	0.3946
Floss Weight	0.012	0.0112	0	0.0126	0.0118	0.0476	3	0.412	0.4177	0.3984	0.3943	0.3933	0.3928	0.3926
W1 (start-floss)	0.3511	0.405	0.412	0.4187	0.4183		4	0.4313	0.4362	0.4159	0.4123	0.4113	0.4107	0.4105
Final constant weight	0.3432	0.3946	0.3926	0.4105	0.4111		5	0.4301	0.4352	0.4167	0.4129	0.4118	0.4112	0.4111
Floss Weight	0.012	0.0112	0	0.0126	0.0118		**Wt-floss**	2.0051	2.0422	1.9324	1.9131	1.9078	1.9052	1.9044
W2 (final-floss)	0.3312	0.3834	0.3926	0.3979	0.3993		**Mean**	0.40102	0.40844	0.38648	0.38262	0.38156	0.38104	0.38088
							sd	0.027831	0.022885	0.027963	0.027891	0.027865	0.027785	0.027762
% SOLUBILITY	5.67	5.33	4.71	4.97	4.54			**Mean solubility**		5.04	0.46			
5mm Group														
Sample	1	2	3	4	5		1	0.5098	0.5156	0.4948	0.489	0.4879	0.4873	0.4871
Start weight	0.5098	0.5004	0.4859	0.4903	0.5003	Floss total	2	0.5004	0.5056	0.4829	0.478	0.4773	0.4776	0.477
Floss Weight	0.0101	0.0105	0.0098	0.0107	0.011	0.0521	3	0.4859	0.4918	0.4705	0.4651	0.4643	0.4633	0.463
W1 (start-floss)	0.4997	0.4899	0.4761	0.4796	0.4893		4	0.4903	0.4966	0.4743	0.4691	0.4685	0.4677	0.4673
Final constant weight	0.4871	0.477	0.463	0.4673	0.4742		5	0.5003	0.5064	0.4824	0.4764	0.4755	0.4744	0.4742
Floss Weight	0.0101	0.0105	0.0098	0.0107	0.011		**Wt-floss**	2.4346	2.4639	2.3528	2.3255	2.3214	2.3182	2.3165
W2 (final-floss)	0.477	0.4665	0.4532	0.4566	0.4632		**Mean**	0.48692	0.49278	0.47056	0.4651	0.46428	0.46364	0.4633
							sd	0.009405	0.009264	0.009369	0.009198	0.009059	0.009276	0.009303
% SOLUBILITY	4.54	4.78	4.81	4.80	5.33			**Mean solubility**		4.85	0.29			

Table 69. Vitremer Restorative One-Week Solubility Control Sample Results (grams)

VITREMER ONE WEEK SOLUBILITY (CONTROL GROUP)						
Weight in grams						
2mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.1913	0.2282	0.212	0.2005	0.2337	Floss total
Floss Weight	0.0128	0.0099	0.0118	0.0109	0.0117	0.0571
W1 (start-floss)	0.1785	0.2183	0.2002	0.1896	0.222	
Final constant weight	0.1794	0.2152	0.2005	0.1886	0.2211	
Floss Weight	0.0128	0.0099	0.0118	0.0109	0.0117	
W2 (final-floss)	0.1666	0.2053	0.1887	0.1777	0.2094	
% SOLUBILITY	6.67	5.96	5.74	6.28	5.68	
3mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.2916	0.309	0.3097	0.2922	0.2916	Floss total
Floss Weight	0.0101	0.0097	0.011	0.0095	0.0127	0.053
W1 (start-floss)	0.2815	0.2993	0.2987	0.2827	0.2789	
Final constant weight	0.277	0.2913	0.2945	0.2768	0.2749	
Floss Weight	0.0101	0.0097	0.011	0.0095	0.0127	
W2 (final-floss)	0.2669	0.2816	0.2835	0.2673	0.2622	
% SOLUBILITY	5.19	5.91	5.09	5.45	5.99	
4mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.3826	0.4341	0.4018	0.3825	0.4038	Floss total
Floss Weight	0.0082	0.009	0.0098	0.0118	0.0109	0.0497
W1 (start-floss)	0.3744	0.4251	0.392	0.3707	0.3929	
Final constant weight	0.36	0.4127	0.3793	0.361	0.3827	
Floss Weight	0.0082	0.009	0.0098	0.0118	0.0109	
W2 (final-floss)	0.3518	0.4037	0.3695	0.3492	0.3718	
% SOLUBILITY	6.04	5.03	5.74	5.80	5.37	
5mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.4378	0.461	0.4496	0.4811	0.4209	Floss total
Floss Weight	0.0103	0.0101	0.0088	0.0094	0.0093	0.0479
W1 (start-floss)	0.4275	0.4509	0.4408	0.4717	0.4116	
Final constant weight	0.4069	0.4334	0.4242	0.4549	0.3987	
Floss Weight	0.0103	0.0101	0.0088	0.0094	0.0093	
W2 (final-floss)	0.3966	0.4233	0.4154	0.4455	0.3894	
% SOLUBILITY	7.23	6.12	5.76	5.55	5.39	

Sample	pre H2O	post H2O						
	5-Jan-06	6-Jan-06	7-Jan-06	8-Jan-06	9-Jan-06	10-Jan-06	11-Jan-06	12-Jan-06
1	0.1913	0.1935	0.182	0.1811	0.1802	0.1799	0.1794	0.1794
2	0.2282	0.2311	0.2173	0.2162	0.2161	0.2157	0.2152	0.2152
3	0.212	0.2149	0.2023	0.2013	0.2011	0.2007	0.2003	0.2005
4	0.2005	0.2033	0.1904	0.1894	0.1893	0.1888	0.1886	0.1886
5	0.2337	0.2365	0.2229	0.2217	0.2218	0.2213	0.2209	0.2211
Wt-floss	1.0086	1.0222	0.9578	0.9526	0.9514	0.9493	0.9473	0.9477
Mean	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.19
sd	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Mean solubility/sd		**6.06**	**0.41**				
1	0.2916	0.295	0.2798	0.2786	0.2784	0.2775	0.2772	0.277
2	0.309	0.3147	0.2946	0.293	0.2928	0.2919	0.2914	0.2913
3	0.3097	0.3147	0.2973	0.296	2959	0.295	0.2944	0.2945
4	0.2922	0.2963	0.2793	0.2781	0.2778	0.2771	0.2767	0.2768
5	0.2916	0.2951	0.2771	0.2763	0.2754	0.2754	0.2749	0.2749
Wt-floss	1.4411	1.4628	1.3751	1.369	2960.071	1.3639	1.3616	1.3615
Mean	0.29	0.29	0.28	0.27	592.01	0.27	0.27	0.27
sd	0.01	0.01	0.01	0.01	1323.18	0.01	0.01	0.01
	Mean solubility/sd		**5.52**	**0.41**				
1	0.3826	0.3877	0.3641	0.3622	0.3617	0.3606	0.3601	0.36
2	0.4341	0.43769	0.4163	0.4147	0.4144	0.4131	0.4127	0.4127
3	0.4018	0.4078	0.3833	0.3817	0.3811	0.38	0.3796	0.3793
4	0.3825	0.3866	0.3642	0.3628	0.3624	0.3613	0.361	0.361
5	0.4038	0.4101	0.3858	0.3846	0.3841	0.383	0.3826	0.3827
Wt-floss	1.9551	1.98019	1.864	1.8563	1.854	1.8483	1.8463	1.846
Mean	0.39	0.40	0.37	0.37	0.37	0.37	0.37	0.37
sd	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Mean solubility/sd		**5.60**	**0.39**				
1	0.4378	0.4381	0.4109	0.4092	0.4086	0.4077	0.4069	0.4069
2	0.461	0.4637	0.4372	0.4354	0.4352	0.4338	0.4332	0.4334
3	0.4496	0.4529	0.4285	0.4265	0.4261	0.4249	0.4242	0.4242
4	0.4811	0.485	0.4591	0.4569	0.4568	0.4555	0.4548	0.4549
5	0.4209	0.4258	0.4024	0.4006	0.4003	0.3992	0.3985	0.3987
Wt-floss	2.2025	2.2176	2.0902	2.0807	2.0791	2.0732	2.0697	2.0702
Mean	0.44	0.44	0.42	0.42	0.42	0.41	0.41	0.41
sd	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Mean solubility/sd		**6.01**	**0.73**				

Table 70. Vitremer One-Month Solubility Experimental Sample Results (grams)

VITREMER ONE MONTH SOLUBILITY (EXPERIMENTAL GROUP)														
		O'Haus Analytical Plus Scale						pre H2O	post H2O					
2mm Group								6-Jan-06	7-Jan-06	8-Jan-06	9-Jan-06	10-Jan-06	11-Jan-06	12-Jan-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2196	0.221	0.2065	0.2062	0.2054	0.2049	0.2051
Start weight	0.2196	0.2451	0.2364	0.2899	0.2261	Floss total	2	0.2451	0.2453	0.23	0.2293	0.2284	0.2279	0.2281
Floss Weight	0.0134	0.013	0.0105	0.0112	0.0095	0.0576	3	0.2364	0.2363	0.2237	0.2231	0.2222	0.2219	0.2221
W1 (start-floss)	0.2062	0.2321	0.2259	0.2787	0.2166		4	0.2899	0.2898	0.2692	0.2685	0.2672	0.2669	0.267
Final constant weight	0.2051	0.2281	0.2221	0.267	0.2123		5	0.2261	0.2269	0.2139	0.2134	0.2124	0.2121	0.2123
Floss Weight	0.0134	0.013	0.0105	0.0112	0.0095		**Wt-floss**	1.1595	1.1617	1.0857	1.0829	1.078	1.0761	1.077
W2 (final-floss)	0.1917	0.2151	0.2116	0.2558	0.2028		**Mean**	0.2319	0.23234	0.21714	0.21658	0.2156	0.21522	0.2154
							sd	0.0277483	0.0272944	0.0243865	0.0242606	0.02408676	0.0241294	0.0240878
% SOLUBILITY	7.03	7.32	6.33	8.22	6.37			**Mean solubility**		7.05	0.78			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2947	0.295	0.272	0.2715	0.2702	0.2694	0.2703
Start weight	0.2947	0.3365	0.2917	0.3057	0.3051	Floss total	2	0.3365	0.3374	0.3156	0.3149	0.3131	0.3126	0.3129
Floss Weight	0.0113	0.0101	0.0114	0.0105	0.0103	0.0536	3	0.2917	0.2922	0.2745	0.2736	0.2724	0.2718	0.2719
W1 (start-floss)	0.2834	0.3264	0.2803	0.2952	0.2948		4	0.3057	0.306	0.2838	0.2829	0.2817	0.2812	0.2814
Final constant weight	0.2703	0.3129	0.2719	0.2814	0.2821		5	0.3051	0.3055	0.2844	0.2836	0.2822	0.2819	0.2821
Floss Weight	0.0113	0.0101	0.0114	0.0105	0.0103		**Wt - floss**	1.4801	1.4825	1.3767	1.3729	1.366	1.3633	1.365
W2 (final-floss)	0.259	0.3028	0.2605	0.2709	0.2718		**Mean**	0.29602	0.2965	0.27534	0.27458	0.2732	0.27266	0.273
							sd	0.0177524	0.0179597	0.0174054	0.0174079	0.01717781	0.0172503	0.01717038
% SOLUBILITY	8.61	7.23	7.06	8.23	7.80			**Mean solubility**		7.79	0.65			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4048	0.4072	0.3848	0.3833	0.3817	0.381	0.3811
Start weight	0.4048	0.4392	0.4092	0.4106	0.3358	Floss total	2	0.4392	0.44	0.4175	0.4162	0.4141	0.4133	0.4135
Floss Weight	0.0113	0.0109	0.0125	0.0115	0.0105	0.0567	3	0.4092	0.4102	0.3859	0.3846	0.3826	0.382	0.3822
W1 (start-floss)	0.3935	0.4283	0.3967	0.3991	0.3253		4	0.4106	0.4113	0.3886	0.3871	0.3852	0.3847	0.3848
Final constant weight	0.3811	0.4135	0.3822	0.3848	0.3153		5	0.3358	0.3361	0.3182	0.3171	0.3156	0.3152	0.3153
Floss Weight	0.0113	0.0109	0.0125	0.0115	0.0105		**Wt-floss**	1.9429	1.9481	1.8383	1.8316	1.8225	1.8195	1.8202
W2 (final-floss)	0.3698	0.4026	0.3697	0.3733	0.3048		**Mean**	0.38858	0.38962	0.36766	0.36632	0.3645	0.3639	0.36404
							sd	0.038335	0.0386076	0.0365797	0.0364758	0.03626407	0.0361308	0.03616182
% SOLUBILITY	6.02	6.00	6.81	6.46	6.30			**Mean solubility**		6.32	0.33			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4609	0.466	0.4342	0.4329	0.4308	0.4299	0.4303
Start weight	0.4609	0.4934	0.4585	0.4726	0.4475	Floss total	2	0.4934	0.4958	0.4618	0.46	0.4577	0.4571	0.4571
Floss Weight	0.0116	0.0108	0.0117	0.0106		0.0447	3	0.4585	0.4595	0.4264	0.4243	0.4223	0.4219	0.4218
W1 (start-floss)	0.4493	0.4826	0.4468	0.462	0.4475		4	0.4726	0.4728	0.4378	0.4361	0.4338	0.4331	0.4332
Final constant weight	0.4303	0.4571	0.4218	0.4332	0.4111		5	0.4475	0.4472	0.4159	0.4138	0.4117	0.4109	0.4111
Floss Weight	0.0116	0.0108	0.0117	0.0106			**Wt-floss**	2.2882	2.2966	2.1314	2.1224	2.1116	2.1082	2.1088
W2 (final-floss)	0.4187	0.4463	0.4101	0.4226	0.4111		**Mean**	0.45764	0.45932	0.42628	0.42448	0.42232	0.42164	0.42176
							sd	0.0174438	0.0180585	0.0170679	0.0171906	0.01709248	0.0171229	0.01707879
% SOLUBILITY	6.81	7.52	8.21	8.53	8.13			**Mean solubility**		7.84	0.68			

Table 71. Vitremer One-Month Solubility Control Sample Results (grams)

VITREMER ONE MONTH SOLUBILITY (CONTROL GROUP)															
START: 12 Dec 05		O'Haus Analytical Plus Scale						pre H2O	post H2O						
2mm Group								12-Jan-06	13-Jan-06	14-Jan-06	15-Jan-06	17-Jan-06	18-Jan-06	19-Jan-06	20-Jan-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2239	0.2243	0.2123	0.2118	0.2112			
Start weight	0.2239	0.2277	0.2288	0.225	0.2333	Floss total	2	0.2277	0.2279	0.2142	0.2138	0.2131			
Floss Weight	0.014	0.0108	0.0131	0.0115	0.0106	0.06	3	0.2288	0.2292	0.2149	0.2145	0.214			
W1 (start-floss)	0.2099	0.2169	0.2157	0.2135	0.2227		4	0.225	0.2246	0.2118	0.2116	0.211			
Final constant weight	0.2112	0.2131	0.214	0.211	0.219		5	0.2333	0.233	0.2198	0.2194	0.219			
Floss Weight	0.014	0.0108	0.0131	0.0115	0.0106		**Wt-floss**	1.0787	1.079	1.013	1.0111	1.0083			
W2 (final-floss)	0.1972	0.2023	0.2009	0.1995	0.2084		**Mean**	0.21574	0.2158	0.2026	0.20222	0.20166			
							sd	0.003684	0.003588	0.003179	0.003155	0.003243			
% SOLUBILITY	**6.05**	**6.73**	**6.86**	**6.56**	**6.42**			**Mean solubility**		**6.52**	**0.31**				
3mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2798	0.2814	0.2615	0.2609	0.2601	0.2595	0.2595	
Start weight	0.2798	0.2916	0.3165	0.3069	0.3114	Floss total	2	0.2916	0.29	0.2678	0.2673	0.2663	0.2659	0.2659	
Floss Weight	0.0099	0	0.01	0.0117	0.0105	0.0421	3	0.3165	0.3167	0.2964	0.2959	0.2949	0.2945	0.2942	
W1 (start-floss)	0.2699	0.2916	0.3065	0.2952	0.3009		4	0.3069	0.3074	0.289	0.2885	0.2875	0.2869	0.2869	
Final constant weight	0.2595	0.2659	0.2942	0.2869	0.2901		5	0.3114	0.3121	0.2921	0.2916	0.2907	0.2903	0.2901	
Floss Weight	0.0099	0	0.01	0.0117	0.0105		**Wt - floss**	1.4641	1.4655	1.3647	1.3621	1.3574	1.355	1.3545	
W2 (final-floss)	0.2496	0.2659	0.2842	0.2752	0.2796		**Mean**	0.29282	0.2931	0.27294	0.27242	0.27148	0.271	0.2709	
							sd	0.015172	0.01512	0.015638	0.01567	0.015624	0.015663	0.015556	
% SOLUBILITY	**7.52**	**8.81**	**7.28**	**6.78**	**7.08**			**Mean solubility**		**7.49**	**0.79**				
4mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3905	0.3927	0.3699	0.3691	0.3677	0.3672	0.3663	0.366
Start weight	0.3905	0.4142	0.412	0.4036	0.3899	Floss total	2	0.4142	0.4153	0.3876	0.3868	0.3855	0.3848	0.38387	0.3837
Floss Weight	0.0091	0.0116	0.0114	0.0106	0.0101	0.0528	3	0.412	0.4133	0.3904	0.3895	0.3882	0.3875	0.3864	0.3866
W1 (start-floss)	0.3814	0.4026	0.4006	0.393	0.3798		4	0.4036	0.4051	0.3783	0.3775	0.3765	0.3757	0.3744	0.3749
Final constant weight	0.366	0.3837	0.3866	0.3749	0.3576		5	0.3899	0.3933	0.3611	0.3603	0.3593	0.3586	0.3579	0.3576
Floss Weight	0.0091	0.0116	0.0114	0.0106	0.0101		**Wt-floss**	1.9574	1.9669	1.8345	1.8304	1.8244	1.821	1.81607	1.816
W2 (final-floss)	0.3569	0.3721	0.3752	0.3643	0.3475		**Mean**	0.39148	0.39338	0.3669	0.36608	0.36488	0.3642	0.363214	0.3632
							sd	0.011511	0.010695	0.012204	0.012178	0.012099	0.012065	0.011933	0.012107
% SOLUBILITY	**6.42**	**7.58**	**6.34**	**7.30**	**8.50**			**Mean solubility**		**7.23**	**0.89**				
5mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.466	0.4662	0.4314	0.4302	0.4288	0.428	0.4272	0.4271
Start weight	0.466	0.4662	0.4547	0.4669	0.4561	Floss total	2	0.4662	0.4669	0.4344	0.4323	0.4307	0.4296	0.4292	0.4289
Floss Weight	0.0126	0	0.0102	0.0102	0.01	0.043	3	0.4547	0.4531	0.4198	0.4179	0.4164	0.4154	0.4144	0.4148
W1 (start-floss)	0.4534	0.4662	0.4445	0.4567	0.4461		4	0.4669	0.4667	0.434	0.4325	0.4312	0.4302	0.4307	0.4296
Final constant weight	0.4271	0.4289	0.4148	0.4296	0.4128		5	0.4561	0.4543	0.4178	0.4162	0.4148	0.4139	0.4134	0.4128
Floss Weight	0.0126	0	0.0102	0.0102	0.01		**Wt-floss**	2.2669	2.2642	2.0944	2.0861	2.0789	2.0741	2.0719	2.0702
W2 (final-floss)	0.4145	0.4289	0.4046	0.4194	0.4028		**Mean**	0.45338	0.45284	0.41888	0.41722	0.41578	0.41482	0.41438	0.41404
							sd	0.006036	0.007083	0.008038	0.008079	0.008085	0.008064	0.008389	0.008152
% SOLUBILITY	**8.58**	**8.00**	**8.98**	**8.17**	**9.71**			**Mean solubility**		**8.69**	**0.68**				

Table 72. Vitremer Three-Month Solubility Experimental Sample Results (grams)

VITREMER 3 month SOLUBILITY (EXPERIMENTAL GROUP)						
	O'Haus Analytical Plus Scale					
2mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.2072	0.215	0.2202	0.2385	0.2352	Floss total
Floss Weight	0.0081	0.0084	0.007	0.0098	0.0084	0.0417
W1 (start-floss)	0.1991	0.2066	0.2132	0.2287	0.2268	
Final constant weight	0.1955	0.2052	0.21	0.2284	0.2242	
Floss Weight	0.0081	0.0084	0.007	0.0098	0.0084	
W2 (final-floss)	0.1874	0.1968	0.203	0.2186	0.2158	
% SOLUBILITY	5.88	4.74	4.78	4.42	4.85	
3mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.314	0.3205	0.2784	0.3154	0.2874	Floss total
Floss Weight	0.0075	0.0074	0.0068	0.0073	0.0071	0.0361
W1 (start-floss)	0.3065	0.3131	0.2716	0.3081	0.2803	
Final constant weight	0.2983	0.3052	0.265	0.2968	0.2721	
Floss Weight	0.0075	0.0074	0.0068	0.0073	0.0071	
W2 (final-floss)	0.2908	0.2978	0.2582	0.2895	0.265	
% SOLUBILITY	5.12	4.89	4.93	6.04	5.46	
4mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.3569	0.3756	0.3794	0.345	0.3891	Floss total
Floss Weight	0.0078	0.0067	0.0071	0.0071	0.0076	0.0363
W1 (start-floss)	0.3491	0.3689	0.3723	0.3379	0.3815	
Final constant weight	0.3375	0.3545	0.3573	0.3232	0.3655	
Floss Weight	0.0078	0.0067	0.0071	0.0071	0.0076	
W2 (final-floss)	0.3297	0.3478	0.3502	0.3161	0.3579	
% SOLUBILITY	5.56	5.72	5.94	6.45	6.19	
5mm Group						
Sample	**1**	**2**	**3**	**4**	**5**	
Start weight	0.4492	0.4436	0.4675	0.4583	0.475	Floss total
Floss Weight	0.0079	0.0077	0.0077	0.0072	0.0077	0.0382
W1 (start-floss)	0.4413	0.4359	0.4598	0.4511	0.4673	
Final constant weight	0.4224	0.416	0.4429	0.4354	0.4473	
Floss Weight	0.0079	0.0077	0.0077	0.0072	0.0077	
W2 (final-floss)	0.4145	0.4083	0.4352	0.4282	0.4396	
% SOLUBILITY	6.07	6.33	5.35	5.08	5.93	

	pre H2O	post H2O									
	7-Oct-05	8-Oct-05	9-Oct-05	10-Oct-05	11-Oct-05	12-Oct-05	13-Oct-05	14-Oct-05	15-Oct-05	16-Oct-05	17-Oct-05
1	0.2072	0.2071	0.1981	0.198	0.1977	0.1959	0.1955				
2	0.215	0.2149	0.2073	0.2065	0.2062	0.2057	0.2052				
3	0.2202	0.2217	0.213	0.2118	0.2114	0.2103	0.21				
4	0.2305	0.2385	0.231	0.23	0.2301	0.2289	0.2284				
5	0.2352	0.2351	0.2265	0.2256	0.2256	0.2245	0.2242				
Wt-Floss	1.0664	1.0756	1.0342	1.0302	1.0293	1.0236	1.0216				
Mean	0.21328	0.21512	0.20684	0.20604	0.20586	0.20472	0.20432				
sd	0.011369	0.013283	0.013574	0.013294	0.01348	0.013583	0.013584				
Mean solubility			4.93	0.55							
1	0.314	0.3166	0.3042	0.3022	0.3019	0.3004	0.2997	0.3008	0.2991	0.2984	0.2983
2	0.3205	0.3219	0.3107	0.3089	0.3088	0.3072	0.3067	0.3079	0.3061	0.3052	0.3052
3	0.2784	0.2789	0.2698	0.2683	0.2681	0.2668	0.2669	0.268	0.2664	0.2658	0.265
4	0.3154	0.3137	0.3028	0.3008	0.3005	0.2991	0.2983	0.2995	0.2977	0.297	0.2968
5	0.2874	0.2871	0.2765	0.2749	0.2747	0.2741	0.2735	0.2747	0.2731	0.2723	0.2721
Wt-Floss	1.4796	1.4821	1.4279	1.419	1.4179	1.4115	1.409	1.4148	1.4063	1.4026	1.4013
Mean	0.29592	0.29642	0.28558	0.2838	0.28358	0.2823	0.2818	0.28296	0.28126	0.28052	0.28026
sd	0.018904	0.019289	0.018338	0.018141	0.018137	0.017866	0.017628	0.017644	0.017552	0.017493	0.017747
Mean solubility			5.29	0.48							
1	0.3579	0.3591	0.345	0.3427	0.3423	0.3406	0.3397	0.3411	0.3389	0.3379	0.3375
2	0.3756	0.3765	0.3621	0.3597	0.3592	0.3575	0.3567	0.3579	0.3557	0.3547	0.3545
3	0.3794	0.3817	0.365	0.3627	0.3622	0.3604	0.3595	0.3608	0.3584	0.3574	0.3573
4	0.345	0.3478	0.3305	0.3282	0.3279	0.3259	0.3252	0.3267	0.3242	0.3236	0.3232
5	0.3891	0.39	0.3733	0.3708	0.3703	0.3685	0.3677	0.3691	0.3667	0.3658	0.3655
Wt-floss	1.8107	1.8188	1.7396	1.7278	1.7256	1.7166	1.7125	1.7193	1.7076	1.7031	1.7017
Mean	0.36214	0.36376	0.34792	0.34556	0.34512	0.34332	0.3425	0.34386	0.34152	0.34062	0.34034
sd	0.017707	0.017216	0.017215	0.017152	0.017066	0.017133	0.017097	0.017027	0.017054	0.016937	0.017026
Mean solubility			5.97	0.36							
1	0.4492	0.4463	0.4311	0.4286	0.4279	0.4259	0.4249	0.4263	0.4237	0.4227	0.4224
2	0.4436	0.4454	0.4242	0.4218	0.4212	0.4194	0.4185	0.42	0.4171	0.4163	0.416
3	0.4675	0.4713	0.4515	0.4491	0.4483	0.447	0.4462	0.4468	0.4441	0.4432	0.4429
4	0.4583	0.4596	0.4442	0.4417	0.4409	0.4389	0.4381	0.4393	0.4366	0.4358	0.4354
5	0.475	0.4757	0.456	0.4534	0.4526	0.4507	0.4499	0.4512	0.4483	0.4474	0.4473
Wt-floss	2.2554	2.2601	2.1688	2.1564	2.1527	2.1437	2.1394	2.1454	2.1316	2.1272	2.1258
Mean	0.45108	0.45202	0.43376	0.43128	0.43054	0.42874	0.42788	0.42908	0.42632	0.42544	0.42516
sd	0.01286	0.013916	0.013462	0.013422	0.013339	0.013438	0.013509	0.013286	0.013275	0.013268	0.013317
Mean solubility			5.75	0.52							

Table 73. Vitremer Three-Month Solubility Control Sample Results (grams)

Vitremer 3 month solubility Control Group												
								14-Oct	15-Oct	16-Oct	17-Oct	18-Oct
2mm Group							Sample	pre H2O	post H2O			
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2158	0.2159	0.2035	0.2032	
Start weight	0.2158	0.1883	0.2117	0.2105	0.2265	Floss total	2	0.1883	0.1887	0.1795	0.1792	
Floss Weight	0.0073	0.0074	0.0071	0.0069	0.008	0.0367	3	0.2117	0.2117	0.1993	0.199	
W1 (start-floss)	0.2085	0.1809	0.2046	0.2036	0.2185		4	0.2105	0.2111	0.2005	0.2003	
Final constant weight	0.2132	0.1872	0.2089	0.2079	0.2248		5	0.2265	0.2268	0.2163	0.2161	
Floss Weight	0.0073	0.0074	0.0071	0.0069	0.008		**Wt-floss**	1.0161	1.0175	0.9624	0.9611	
W2 (final-floss)	0.2059	0.1798	0.2018	0.201	0.2168		**Mean**	0.20322	0.2035	0.19248	0.19222	
							sd	0.013949	0.013886	0.013217	0.01325	
% SOLUBILITY	4.59	4.51	4.68	4.51	4.28		**Mean solubility**		4.51	0.15		
3mm Group												
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2871	0.2884	0.2725	0.272	
Start weight	0.2871	0.3305	0.3202	0.3048	0.3079	Floss total	2	0.3305	0.3319	0.3155	0.315	
Floss Weight	0.0066	0.0076	0.0064	0.0062	0.0069	0.0337	3	0.3202	0.3215	0.3038	0.3034	
W1 (start-floss)	0.2805	0.3229	0.3138	0.2986	0.301		4	0.3048	0.3064	0.2891	0.2887	
Final constant weight	0.272	0.315	0.3034	0.2887	0.2892		5	0.3079	0.3084	0.2897	0.2892	
Floss Weight	0.0066	0.0076	0.0064	0.0062	0.0069		**Wt-floss**	1.5168	1.5229	1.4369	1.4346	
W2 (final-floss)	0.2654	0.3074	0.297	0.2825	0.2823		**Mean**	0.30336	0.30458	0.28738	0.28692	
							sd	0.016432	0.016471	0.016302	0.016309	
% SOLUBILITY	5.38	4.80	5.35	5.39	6.21		**Mean solubility**		5.43	0.50		
4mm Group												
Sample	**1**	**2**	**3**	**4**	**5**		1	0.386	0.3885	0.3693	0.3685	0.3684
Start weight	0.386	0.3907	0.3852	0.3911	0.3788	Floss total	2	0.3907	0.3928	0.3685	0.3675	0.367
Floss Weight	0.0067	0.0066	0.0064	0.0061	0.0067	0.0325	3	0.3852	0.3875	0.3693	0.3687	0.3686
W1 (start-floss)	0.3793	0.3841	0.3788	0.385	0.3721		4	0.3911	0.3932	0.3732	0.3723	0.3722
Final constant weight	0.3684	0.367	0.3686	0.3722	0.3575		5	0.3788	0.3799	0.3586	0.3577	0.3575
Floss Weight	0.0067	0.0066	0.0064	0.0061	0.0067		**Wt-floss**	1.8993	1.9094	1.8064	1.8022	1.8012
W2 (final-floss)	0.3617	0.3604	0.3622	0.3661	0.3508		**Mean**	0.37986	0.38188	0.36128	0.36044	0.36024
							sd	0.004998	0.005373	0.005449	0.005476	0.005511
% SOLUBILITY	4.64	6.17	4.38	4.91	5.72		**Mean solubility**		5.17	0.75		
5mm Group												
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4244	0.4283	0.3953	0.3938	0.3936
Start weight	0.4244	0.4837	0.4942	0.4816	0.4733	Floss total	2	0.4837	0.4865	0.4586	0.4576	0.4573
Floss Weight	0.0076	0.0071	0.0077	0.0075	0.0072	0.0371	3	0.4942	0.4967	0.4682	0.4669	0.4667
W1 (start-floss)	0.4168	0.4766	0.4865	0.4741	0.4661		4	0.4816	0.4831	0.4561	0.455	0.455
Final constant weight	0.3936	0.4573	0.4667	0.455	0.4485		5	0.4733	0.4762	0.4497	0.4486	0.4485
Floss Weight	0.0076	0.0071	0.0077	0.0075	0.0072		**Wt-floss**	2.3201	2.3337	2.1908	2.1848	2.184
W2 (final-floss)	0.386	0.4502	0.459	0.4475	0.4413		**Mean**	0.46402	0.46674	0.43816	0.43696	0.4368
							sd	0.02733	0.026681	0.028883	0.02903	0.02904
% SOLUBILITY	7.39	5.54	5.65	5.61	5.32		**Mean solubility**		5.90	0.84		

Table 74. Fuji II LC Immediate Solubility Experimental Sample Results (grams)

FUJI II LC Immediate SOLUBILITY (EXPERIMENTAL GROUP)

O'Haus Analytical Plus Scale

2mm Group						
Sample	1	2	3	4	5	
Start weight	0.2466	0.2597	0.2572	0.2493	0.2621	Floss total
Floss Weight	0.0103	0.0101	0.009	0.0089	0.009	0.0473
W1 (start-floss)	0.2363	0.2496	0.2482	0.2404	0.2531	
Final constant weight	0.237	0.249	0.2486	0.2402	0.2524	
Floss Weight	0.0103	0.0101	0.009	0.0089	0.009	
W2 (final-floss)	0.2267	0.2389	0.2396	0.2313	0.2434	
% SOLUBILITY	4.06	4.29	3.46	3.79	3.83	

	4-Oct-05	5-Oct-05	6-Oct-05	7-Oct-05
1	0.2466	0.2376	0.2372	0.237
2	0.2597	0.2502	0.2494	0.249
3	0.2572	0.2484	0.2489	0.2486
4	0.2493	0.2404	0.24	0.2402
5	0.2621	0.253	0.2526	0.2524
Wt-floss	1.2276	1.1823	1.1808	1.1799
Mean	0.24552	0.23646	0.23616	0.23598
sd	0.006715	0.006601	0.006638	0.006515
Mean solubility			3.89	0.31

3mm Group						
Sample	1	2	3	4	5	
Start weight	0.336	0.3533	0.3636	0.3623	0.3556	Floss total
Floss Weight	0.0106	0.0108	0.0105	0.0095	0.0103	0.0517
W1 (start-floss)	0.3254	0.3425	0.3531	0.3528	0.3453	
Final constant weight	0.3231	0.3403	0.3506	0.3485	0.3427	
Floss Weight	0.0106	0.0108	0.0105	0.0095	0.0103	
W2 (final-floss)	0.3125	0.3295	0.3401	0.339	0.3324	
% SOLUBILITY	3.96	3.80	3.68	3.91	3.74	

	4-Oct-05	5-Oct-05	6-Oct-05	7-Oct-05
1	0.336	0.3246	0.3234	0.3231
2	0.3533	0.2414	0.3407	0.3403
3	0.3636	0.3515	0.3508	0.3506
4	0.3623	0.3496	0.3488	0.3485
5	0.3556	0.3437	0.343	0.3427
Wt-floss	1.7191	1.5591	1.655	1.6535
Mean	0.34382	0.31182	0.331	0.3307
sd	0.011045	0.046384	0.010841	0.010865
Mean solubility			3.82	0.12

4mm Group						
Sample	1	2	3	4	5	
Start weight	0.4378	0.4584	0.4538	0.4609	0.4677	Floss total
Floss Weight	0.0113	0.0104	0.0116	0.011	0.0104	0.0547
W1 (start-floss)	0.4265	0.448	0.4422	0.4499	0.4573	
Final constant weight	0.4221	0.4221	0.437	0.442	0.449	
Floss Weight	0.0113	0.0104	0.0116	0.011	0.0104	
W2 (final-floss)	0.4108	0.4117	0.4254	0.431	0.4386	
% SOLUBILITY	3.68	8.10	3.80	4.20	4.09	

	4-Oct-05	5-Oct-05	6-Oct-05	7-Oct-05	8-Oct-05
1	0.4378	0.4238	0.423	0.4229	0.4221
2	0.4584	0.4439	0.443	0.4426	0.4221
3	0.4538	0.4389	0.438	0.4376	0.437
4	0.4609	0.4439	0.443	0.4427	0.442
5	0.4677	0.4513	0.4499	0.4494	0.449
Wt-floss	2.2239	2.1471	2.1422	2.1405	2.1175
Mean	0.44478	0.42942	0.42844	0.4281	0.4235
sd	0.011207	0.010261	0.010088	0.00995	0.012044
Mean solubility			4.77	1.87	

5mm Group						
Sample	1	2	3	4	5	
Start weight	0.51	0.5404	0.5437	0.5481	0.5453	Floss total
Floss Weight	0.0107	0.0104	0.0104	0.0102	0.0106	0.0523
W1 (start-floss)	0.4993	0.53	0.5333	0.5379	0.5347	
Final constant weight	0.487	0.5153	0.519	0.522	0.518	
Floss Weight	0.0107	0.0104	0.0104	0.0102	0.0106	
W2 (final-floss)	0.4763	0.5049	0.5086	0.5118	0.5074	
% SOLUBILITY	4.61	4.74	4.63	4.85	5.11	

	4-Oct-05	5-Oct-05	6-Oct-05	7-Oct-05	8-Oct-05	9-Oct-05	10-Oct-05	11-Oct-05	12-Oct-05	13-Oct-05	14-Oct-05	15-Oct-05	16-Oct-05	17-Oct-05
1	0.51	0.4958	0.4949	0.4943	0.4936	0.4921	0.491	0.4904	0.4892	0.4486	0.4893	0.4878	0.4872	0.487
2	0.5404	0.5245	0.5236	0.523	0.5221	0.5206	0.5195	0.519	0.5175	0.5169	0.5178	0.5161	0.5156	0.5153
3	0.5437	0.528	0.527	0.5264	0.5255	0.5242	0.523	0.5225	0.521	0.5205	0.5214	0.5197	0.5191	0.519
4	0.5481	0.5307	0.5303	0.5291	0.5282	0.527	0.5258	0.5253	0.524	0.5233	0.5241	0.5224	0.522	0.522
5	0.5453	0.5271	0.5258	0.5251	0.5274	0.5227	0.5216	0.5213	0.5198	0.5192	0.5202	0.5183	0.518	0.518
Wt-floss	2.6352	2.5538	2.5493	2.5456	2.5445	2.5343	2.5286	2.5262	2.5192	2.4762	2.5205	2.512	2.5096	2.509
Mean	0.52704	0.51076	0.50986	0.50912	0.5089	0.50686	0.50572	0.50524	0.50384	0.49524	0.5041	0.5024	0.50192	0.5018
sd	0.015623	0.014382	0.014415	0.014304	0.014591	0.01429	0.014261	0.014324	0.014226	0.032004	0.014302	0.014194	0.014263	0.014323
Mean solubility			4.79	0.20										

Table 75. Fuji II LC Immediate Solubility Control Sample Results (grams)

FUJI II LC Immediate SOLUBILITY (Control GROUP)												
		O'Haus Analytical Plus Scale										
								pre H2O	post H2O			
2mm Group								11-Nov-05	12-Nov-05	13-Nov-05	14-Nov-05	15-Nov-05
Sample	1	2	3	4	5		1	0.2233	0.2298	0.2194	0.2187	0.2187
Start weight	0.2233	0.2194	0.2368	0.2365	0.2321	Floss total	2	0.2194	0.2263	0.2156	0.2151	0.2152
Floss Weight	0.0103	0.0095	0.0098	0.0096	0.0101	0.0493	3	0.2368	0.2446	0.2325	0.2318	0.2317
W1 (start-floss)	0.213	0.2099	0.227	0.2269	0.2274		4	0.2365	0.244	0.232	0.2314	0.2315
Final constant weight	0.2187	0.2152	0.2317	0.2315	0.2274		5	0.2321	0.2394	0.2277	0.2272	0.2274
Floss Weight	0.0103	0.0095	0.0098	0.0096	0.0101		Wt-floss	1.0988	1.1348	1.0779	1.0749	1.0752
W2 (final-floss)	0.2084	0.2057	0.2219	0.2219	0.2173		Mean	0.21976	0.22696	0.21558	0.21498	0.21504
							sd	0.007897	0.008347	0.007604	0.007576	0.007559
% SOLUBILITY	2.16	2.00	2.25	2.20	4.44			Mean solubility		2.61	1.03	
3mm Group												
Sample	1	2	3	4	5		1	0.3027	0.3121	0.2976	0.2964	0.2968
Start weight	0.3027	0.3425	0.3381	0.3326	0.3531	Floss total	2	0.3425	0.3558	0.3397	0.3391	0.3391
Floss Weight	0.0099	0.0089	0.0112	0.0106	0.0107	0.0513	3	0.3381	0.3462	0.3316	0.3311	0.331
W1 (start-floss)	0.2928	0.3336	0.3269	0.322	0.3424		4	0.3326	0.3424	0.3278	0.3269	0.3269
Final constant weight	0.2968	0.3391	0.331	0.3269	0.3462		5	0.3531	0.3627	0.3468	0.3461	0.3462
Floss Weight	0.0099	0.0089	0.0112	0.0106	0.0107		Wt-floss	1.6177	1.6679	1.5922	1.5883	1.5887
W2 (final-floss)	0.2869	0.3302	0.3198	0.3163	0.3355		Mean	0.32354	0.33358	0.31844	0.31766	0.31774
							sd	0.018943	0.019454	0.018875	0.019106	0.018961
% SOLUBILITY	2.02	1.02	2.17	1.77	2.02			Mean solubility		1.80	0.46	
4mm Group												
Sample	1	2	3	4	5		1	0.4359	0.4464	0.4284	0.4275	0.4276
Start weight	0.4359	0.4333	0.4652	0.4508	0.4247	Floss total	2	0.4333	0.4434	0.425	0.424	0.424
Floss Weight	0.0083	0.0107	0.0108	0.0082	0	0.038	3	0.4652	0.4772	0.4562	0.4549	0.455
W1 (start-floss)	0.4276	0.4226	0.4544	0.4426	0.4247		4	0.4508	0.461	0.4421	0.441	0.441
Final constant weight	0.4276	0.424	0.455	0.441	0.4155		5	0.4247	0.434	0.4165	0.4152	0.4155
Floss Weight	0.0083	0.0107	0.0108	0.0082	0		Wt-floss	2.1719	2.224	2.1302	2.1246	2.1251
W2 (final-floss)	0.4193	0.4133	0.4442	0.4328	0.4155		Mean	0.43438	0.4448	0.42604	0.42492	0.42502
							sd	0.01603	0.016916	0.015624	0.015577	0.015522
% SOLUBILITY	1.94	2.20	2.24	2.21	2.17			Mean solubility		2.15	0.12	
5mm Group												
Sample	1	2	3	4	5		1	0.533	0.5457	0.5241	0.5224	0.5223
Start weight	0.533	0.5363	0.541	0.538	0.5444	Floss total	2	0.5363	0.5472	0.5269	0.5255	0.5255
Floss Weight	0.0121	0.0102	0.0097	0.0091	0.0103	0.0514	3	0.541	0.5558	0.5317	0.5299	0.5298
W1 (start-floss)	0.5209	0.5261	0.5313	0.5289	0.5341		4	0.538	0.5485	0.5282	0.5266	0.5265
Final constant weight	0.5223	0.5255	0.5298	0.5265	0.5323		5	0.5444	0.554	0.5339	0.5323	0.5323
Floss Weight	0.0121	0.0102	0.0097	0.0091	0.0103		Wt-floss	2.6413	2.6998	2.5934	2.5853	2.585
W2 (final-floss)	0.5102	0.5153	0.5201	0.5174	0.522		Mean	0.52826	0.53996	0.51868	0.51706	0.517
							sd	0.00437	0.004414	0.003884	0.003857	0.003877
% SOLUBILITY	2.05	2.05	2.11	2.17	2.27			Mean solubility		2.13	0.09	

Table 76. Fuji II LC 24-Hour Solubility Experimental Sample Results (grams)

Fuji II LC	24 Hour	solubility	Experimental											
			O'Haus Analytical Plus Scale											
								pre-H2O	post H2O					
2mm Group								29-Nov	30-Nov	1-Dec	2-Dec-05	3-Dec-05	4-Dec-05	5-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2206	0.2244	0.2146	0.2141	0.2136		
Start weight	0.2206	0.2378	0.2382	0.224	0.2459	Floss total	2	0.2378	0.2419	0.2312	0.2308	0.2303		
Floss Weight	0.0119	0.0102	0.0101	0.0103	0.0104	0.0529	3	0.2382	0.2418	0.2316	0.231	0.2305		
W1 (start-floss)	0.2087	0.2276	0.2281	0.2137	0.2355		4	0.224	0.2275	0.2181	0.2176	0.2173		
Final constant weight	0.2136	0.2303	0.2305	0.2173	0.2381		5	0.2459	0.25	0.2391	0.2386	0.2381		
Floss Weight	0.0119	0.0102	0.0101	0.0103	0.0104		**Wt-floss**	1.1136	1.1327	1.0817	1.0792	1.0769		
W2 (final-floss)	0.2017	0.2201	0.2204	0.207	0.2277		**Mean**	0.22272	0.22654	0.21634	0.21584	0.21538		
							sd	0.010616	0.010782	0.010224	0.010224	0.010181		
% SOLUBILITY	3.35	3.30	3.38	3.14	3.31			**Mean solubility**		3.29	0.09			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.322	0.3274	0.3135	0.3126	0.3122		
Start weight	0.322	0.3534	0.3342	0.3499	0.3357	Floss total	2	0.3534	0.3593	0.3435	0.3429	0.3424		
Floss Weight	0.0103	0.0109	0.0111	0.0117	0.011	0.055	3	0.3342	0.3391	0.3256	0.3247	0.3241		
W1 (start-floss)	0.3117	0.3425	0.3231	0.3382	0.3247		4	0.3499	0.3555	0.3408	0.3399	0.3393		
Final constant weight	0.3122	0.3424	0.3241	0.3393	0.3251		5	0.3357	0.3418	0.3265	0.3256	0.3251		
Floss Weight	0.0103	0.0109	0.0111	0.0117	0.011		**Wt-floss**	1.6402	1.6681	1.5949	1.5907	1.5881		
W2 (final-floss)	0.3019	0.3315	0.313	0.3276	0.3141		**Mean**	0.32804	0.33362	0.31898	0.31814	0.31762		
							sd	0.012739	0.012931	0.012275	0.012359	0.012312		
% SOLUBILITY	3.14	3.21	3.13	3.13	3.26			**Mean solubility**		3.18	0.06			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4583	0.4643	0.4478	0.4462	0.4454	0.4451	0.445
Start weight	0.4583	0.4618	0.4507	0.4572	0.4357	Floss total	2	0.4618	0.4681	0.45	0.4489	0.4482	0.4478	0.4478
Floss Weight	0.0113	0.0115	0.0117	0.0102	0.0097	0.0544	3	0.4507	0.4572	0.4396	0.4383	0.4376	0.4373	0.4373
W1 (start-floss)	0.447	0.4503	0.439	0.447	0.426		4	0.4572	0.4627	0.4461	0.4445	0.4438	0.4434	0.4435
Final constant weight	0.445	0.4478	0.4373	0.4435	0.4232		5	0.4357	0.4416	0.4258	0.4243	0.4235	0.4233	0.4232
Floss Weight	0.0113	0.0115	0.0117	0.0102	0.0097		**Wt-floss**	2.2093	2.2395	2.1549	2.1478	2.1441	2.1425	2.1424
W2 (final-floss)	0.4337	0.4363	0.4256	0.4333	0.4135		**Mean**	0.44186	0.4479	0.43098	0.42956	0.42882	0.4285	0.42848
							sd	0.010337	0.010372	0.009779	0.009827	0.009854	0.009781	0.009818
% SOLUBILITY	2.98	3.11	3.05	3.06	2.93			**Mean solubility**		3.03	0.07			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.538	0.5461	0.526	0.5242	0.5232	0.5227	0.5227
Start weight	0.538	0.5498	0.5189	0.5247	0.5474	Floss total	2	0.5498	0.5562	0.5377	0.5358	0.5348	0.5345	0.5345
Floss Weight	0.0101	0.0109	0.0089	0.0105	0.0118	0.0522	3	0.5189	0.5246	0.5067	0.5051	0.5042	0.5038	0.5038
W1 (start-floss)	0.5279	0.5389	0.51	0.5142	0.5356		4	0.5247	0.53	0.5125	0.5105	0.5096	0.5094	0.5094
Final constant weight	0.5227	0.5345	0.5038	0.5094	0.532		5	0.5474	0.5536	0.5351	0.5334	0.5323	0.5321	0.532
Floss Weight	0.0101	0.0109	0.0089	0.0105	0.0118		**Wt-floss**	2.6266	2.6583	2.5658	2.5568	2.5519	2.5503	2.5502
W2 (final-floss)	0.5126	0.5236	0.4949	0.4989	0.5202		**Mean**	0.52532	0.53166	0.51316	0.51136	0.51038	0.51006	0.51004
							sd	0.01364	0.01414	0.013653	0.013628	0.013556	0.0135785	0.0135572
% SOLUBILITY	2.90	2.84	2.96	2.98	2.88			**Mean solubility**		2.91	0.06			

Table 77. Fuji II LC 24-Hour Solubility Control Sample Results (grams)

Fuji II 24-HR SOLUBILITY (CONTROL GROUP)													
		O'Haus Analytical Plus Scale						pre H2O	post H2O				
2mm Group								10-Jan-06	11-Jan-06	12-Jan-06	13-Jan-06	14-Jan-06	15-Jan-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2482	0.2504	0.24	0.2394	0.2389	0.239
Start weight	0.2482	0.233	0.2409	0.2507	0.2533	Floss total	2	0.233	0.2355	0.2249	0.2244	0.2239	0.2239
Floss Weight	0.0114	0.0106	0.0126	0.0116	0.0103	0.0565	3	0.2409	0.2444	0.2329	0.2321	0.2319	0.2319
W1 (start-floss)	0.2368	0.2224	0.2283	0.2391	0.243		4	0.2507	0.2542	0.2429	0.2422	0.2418	0.2418
Final constant weight	0.239	0.2239	0.2319	0.2418	0.2445		5	0.2533	0.256	0.2455	0.2446	0.2442	0.2445
Floss Weight	0.0114	0.0106	0.0126	0.0116	0.0103		**Wt-floss**	1.1696	1.184	1.1297	1.1262	1.1242	1.1246
W2 (final-floss)	0.2276	0.2133	0.2193	0.2302	0.2342		**Mean**	0.23392	0.2368	0.22594	0.22524	0.22484	0.22492
							sd	0.00824906	0.0083271	0.00835153	0.00825033	0.00825245	0.00833469
% SOLUBILITY	3.89	4.09	3.94	3.72	3.62			**Mean solubility**		**3.85**	**0.18**		
3mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3593	0.3644	0.3492	0.348	0.3474	0.3474
Start weight	0.3593	0.3617	0.3584	0.3644	0.3654	Floss total	2	0.3617	0.3684	0.3521	0.3508	0.35	0.3502
Floss Weight	0.0097	0.0119	0.0106	0.0102	0.0087	0.0511	3	0.3584	0.3644	0.3488	0.3482	0.3474	0.3474
W1 (start-floss)	0.3496	0.3498	0.3478	0.3542	0.3567		4	0.3644	0.3696	0.3547	0.3539	0.3531	0.3532
Final constant weight	0.3474	0.3502	0.3474	0.3532	0.3541		5	0.3654	0.3706	0.3561	0.3549	0.3542	0.3541
Floss Weight	0.0097	0.0119	0.0106	0.0102	0.0087		**Wt - floss**	1.7581	1.7863	1.7098	1.7047	1.701	1.7012
W2 (final-floss)	0.3377	0.3383	0.3368	0.343	0.3454		**Mean**	0.35162	0.35726	0.34196	0.34094	0.3402	0.34024
							sd	0.00306317	0.0029175	0.00324145	0.00317695	0.00315785	0.00314452
% SOLUBILITY	3.40	3.29	3.16	3.16	3.17			**Mean solubility**		**3.24**	**0.11**		
4mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4681	0.4733	0.4553	0.4539	0.4527	0.4528
Start weight	0.4681	0.4536	0.4775	0.4561	0.4526	Floss total	2	0.4536	0.4607	0.4428	0.4412	0.4402	0.4403
Floss Weight	0.011	0.0109	0.0103	0.011	0.0095	0.0527	3	0.4775	0.4833	0.4656	0.464	0.4628	0.4628
W1 (start-floss)	0.4571	0.4427	0.4672	0.4451	0.4431		4	0.4561	0.4607	0.4434	0.442	0.4409	0.4409
Final constant weight	0.4528	0.4403	0.4628	0.4409	0.4384		5	0.4526	0.458	0.4409	0.4395	0.4385	0.4384
Floss Weight	0.011	0.0109	0.0103	0.011	0.0095		**Wt-floss**	2.2552	2.2833	2.1953	2.1879	2.1824	2.1825
W2 (final-floss)	0.4418	0.4294	0.4525	0.4299	0.4289		**Mean**	0.45104	0.45666	0.43906	0.43758	0.43648	0.4365
							sd	0.01084329	0.0107884	0.01059316	0.01055021	0.01046217	0.01048012
% SOLUBILITY	3.35	3.00	3.15	3.41	3.20			**Mean solubility**		**3.22**	**0.16**		
5mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5434	0.5501	0.5289	0.5271	0.5258	0.5259
Start weight	0.5434	0.5321	0.5479	0.5304	0.5438	Floss total	2	0.5321	0.5402	0.5193	0.5175	0.5164	0.5162
Floss Weight	0.0109	0.011	0.0102	0.0089	0.0098	0.0508	3	0.5479	0.5533	0.5337	0.532	0.5306	0.5306
W1 (start-floss)	0.5325	0.5211	0.5377	0.5215	0.534		4	0.5304	0.5357	0.5162	0.5143	0.5133	0.5132
Final constant weight	0.5259	0.5162	0.5306	0.5132	0.527		5	0.5438	0.5498	0.5299	0.5284	0.527	0.527
Floss Weight	0.0109	0.011	0.0102	0.0089	0.0098		**Wt-floss**	2.6468	2.6783	2.5772	2.5685	2.5623	2.5621
W2 (final-floss)	0.515	0.5052	0.5204	0.5043	0.5172		**Mean**	0.52936	0.53566	0.51544	0.5137	0.51246	0.51242
							sd	0.00777541	0.0074851	0.00746726	0.00756987	0.00739135	0.0074761
% SOLUBILITY	3.29	3.05	3.22	3.30	3.15			**Mean solubility**		**3.20**	**0.10**		

Table 78. Fuji II LC One-Week Solubility Experimental Sample Results (grams)

FUJI II LC One Week SOLUBILITY (EXPERIMENTAL GROUP)														
	O'Haus Analytical Plus Scale													
								pre H2O	post H2O					
2mm Group								28-Nov-05	29-Nov-05	30-Nov-05	1-Dec-05	2-Dec-05	3-Dec-05	4-Dec-05
Sample	1	2	3	4	5									
Start weight	0.2134	0.224	0.2288	0.2287	0.2296	Floss total	1	0.2134	0.214	0.2042	0.2036	0.2035		
Floss Weight	0.0114	0.0112	0.0105	0.0105	0.0089	0.0525	2	0.224	0.2301	0.2191	0.2186	0.2184		
W1 (start-floss)	0.202	0.2128	0.2183	0.2182	0.2207		3	0.2288	0.2288	0.2184	0.2178	0.2179		
Final constant weight	0.2035	0.2184	0.2179	0.2185	0.2135		4	0.2287	0.229	0.219	0.2184	0.2185		
Floss Weight	0.0114	0.0112	0.0105	0.0105	0.0089		5	0.2296	0.224	0.214	0.2135	0.2135		
W2 (final-floss)	0.1921	0.2072	0.2074	0.208	0.2046		Wt-floss	1.072	1.0734	1.0222	1.0194	1.0193		
							Mean	0.2144	0.21468	0.20444	0.20388	0.20386		
							sd	0.00679706	0.00667623	0.0063638	0.0063767	0.0064162		
% SOLUBILITY	4.90	2.63	4.99	4.67	7.29			Mean solubility		4.90	1.65			
3mm Group														
Sample	1	2	3	4	5									
Start weight	0.3639	0.3242	0.352	0.3483	0.3581	Floss total	1	0.3639	0.3648	0.3498	0.3485	0.3485	0.3482	0.3481
Floss Weight	0.0102	0.0119	0.0121	0.0118	0.0102	0.0562	2	0.3242	0.3251	0.3108	0.3102	0.31	0.3098	0.3097
W1 (start-floss)	0.3537	0.3123	0.3399	0.3365	0.3479		3	0.352	0.3541	0.3375	0.3365	0.3366	0.3363	0.3361
Final constant weight	0.3481	0.3097	0.3361	0.3327	0.3414		4	0.3483	0.3488	0.3341	0.3331	0.3331	0.3329	0.3327
Floss Weight	0.0102	0.0119	0.0121	0.0118	0.0102		5	0.3581	0.3599	0.3429	0.342	0.3419	0.3414	0.3414
W2 (final-floss)	0.3379	0.2978	0.324	0.3209	0.3312		Wt-floss	1.6903	1.6965	1.6189	1.6141	1.6139	1.6124	1.6118
							Mean	0.33806	0.3393	0.32378	0.32282	0.32278	0.32248	0.32236
							sd	0.01523893	0.01544225	0.014783	0.0145579	0.0146307	0.0145615	0.0145719
% SOLUBILITY	4.47	4.64	4.68	4.64	4.80			Mean solubility		4.64	0.12			
4mm Group														
Sample	1	2	3	4	5									
Start weight	0.4851	0.4358	0.4401	0.4337	0.4458	Floss total	1	0.4851	0.4857	0.4646	0.4633	0.4629	0.4626	0.4624
Floss Weight	0.0104	0.0115	0.0119	0.0094	0.0104	0.0536	2	0.4358	0.4363	0.4167	0.4154	0.415	0.4148	0.4145
W1 (start-floss)	0.4747	0.4243	0.4282	0.4243	0.4354		3	0.4401	0.4424	0.4229	0.4218	0.4215	0.4209	0.4209
Final constant weight	0.4624	0.4145	0.4209	0.4134	0.4245		4	0.4337	0.4367	0.4154	0.4143	0.4139	0.4136	0.4134
Floss Weight	0.0104	0.0115	0.0119	0.0094	0.0104		5	0.4458	0.4493	0.4268	0.4256	0.4251	0.4248	0.4245
W2 (final-floss)	0.452	0.403	0.409	0.404	0.4141		Wt-floss	2.1869	2.1968	2.0928	2.0868	2.0848	2.0831	2.0821
							Mean	0.43738	0.43936	0.41856	0.41736	0.41696	0.41662	0.41642
							sd	0.02119516	0.02059908	0.02028095	0.0202281	0.0202236	0.0202314	0.0202345
% SOLUBILITY	4.78	5.02	4.48	4.78	4.89			Mean solubility		4.79	0.20			
5mm Group														
Sample	1	2	3	4	5									
Start weight	0.5468	0.544	0.5518	0.543	0.5471	Floss total	1	0.5468	0.5505	0.5268	0.5252	0.5246	0.5242	0.5241
Floss Weight	0.0117	0.0115	0.0105	0.0106	0.011	0.0553	2	0.544	0.5477	0.5248	0.5233	0.5225	0.5219	0.5219
W1 (start-floss)	0.5351	0.5325	0.5413	0.5324	0.5361		3	0.5518	0.5555	0.5312	0.5295	0.5289	0.5283	0.5281
Final constant weight	0.5241	0.5219	0.5281	0.5147	0.5169		4	0.543	0.5435	0.5174	0.5157	0.5153	0.5148	0.5147
Floss Weight	0.0117	0.0115	0.0105	0.0106	0.011		5	0.5471	0.5472	0.5197	0.5181	0.5174	0.5169	0.5169
W2 (final-floss)	0.5124	0.5104	0.5176	0.5041	0.5059		Wt-floss	2.6774	2.6891	2.5646	2.5565	2.5534	2.5508	2.5504
							Mean	0.53548	0.53782	0.51292	0.5113	0.51068	0.51016	0.51008
							sd	0.00342899	0.00446117	0.005531	0.0055324	0.0054848	0.0054623	0.0054137
% SOLUBILITY	4.24	4.15	4.38	5.32	5.63			Mean solubility		4.74	0.68			

Table 79. Fuji II LC One-Week Solubility Control Sample Results (grams)

FUJI II LC One Week SOLUBILITY (Control GROUP)															
	O'Haus Analytical Plus Scale														
								pre H2O	post H2O						
2mm Group								5-Dec-05	6-Dec-05	7-Dec-05	8-Dec-05	9-Dec-05	10-Dec-05	11-Dec-05	12-Dec-05
Sample	1	2	3	4	5		1	0.2244	0.2244	0.2137	0.2136	0.2137			
Start weight	0.2244	0.2284	0.2293	0.2305	0.2275	Floss total	2	0.2284	0.228	0.2181	0.2179	0.2178			
Floss Weight	0.0119	0.0122	0.01	0.0108	0.0103	0.0552	3	0.2293	0.2288	0.2177	0.2176	0.2178			
W1 (start-floss)	0.2125	0.2162	0.2193	0.2197	0.2172		4	0.2305	0.2297	0.2186	0.2185	0.2186			
Final constant weight	0.2137	0.2178	0.2178	0.2186	0.2166		5	0.2275	0.2272	0.2168	0.2166	0.2166			
Floss Weight	0.0119	0.0122	0.01	0.0108	0.0103		Wt-floss	1.0849	1.0829	1.0297	1.029	1.0293			
W2 (final-floss)	0.2018	0.2056	0.2078	0.2078	0.2063		Mean	0.21698	0.21658	0.20594	0.2058	0.20586			
							sd	0.002308	0.002025	0.001949	0.001937	0.001926			
% SOLUBILITY	5.04	4.90	5.24	5.42	5.02		Mean solubility			5.12	0.20				
3mm Group															
Sample	1	2	3	4	5		1	0.3728	0.3735	0.3569	0.3563	0.3563			
Start weight	0.3728	0.3267	0.3449	0.3427	0.3776	Floss total	2	0.3267	0.3265	0.3124	0.3118	0.312			
Floss Weight	0.0102	0.0106	0.0084	0.01	0.0106	0.0498	3	0.3449	0.3453	0.3295	0.329	0.329			
W1 (start-floss)	0.3626	0.3161	0.3365	0.3327	0.367		4	0.3427	0.343	0.3279	0.3273	0.3275			
Final constant weight	0.3563	0.312	0.329	0.3275	0.3612		5	0.3776	0.3782	0.3619	0.3612	0.3612			
Floss Weight	0.0102	0.0106	0.0084	0.01	0.0106		Wt-floss	1.7149	1.7167	1.6388	1.6358	1.6362			
W2 (final-floss)	0.3461	0.3014	0.3206	0.3175	0.3506		Mean	0.34298	0.34334	0.32776	0.32716	0.32724			
							sd	0.021567	0.021888	0.020962	0.020924	0.02084			
% SOLUBILITY	4.55	4.65	4.73	4.57	4.47		Mean solubility			4.59	0.10				
4mm Group															
Sample	1	2	3	4	5		1	0.4922	0.4937	0.4712	0.4702	0.4696	0.4684	0.4682	
Start weight	0.4922	0.4615	0.4658	0.4533	0.4433	Floss total	2	0.4615	0.4642	0.4438	0.4429	0.4424	0.4414	0.4411	
Floss Weight	0.0097	0.0116	0.0097	0.0098	0.0101	0.0509	3	0.4658	0.4678	0.4483	0.4473	0.4468	0.4458	0.4456	
W1 (start-floss)	0.4825	0.4499	0.4561	0.4435	0.4332		4	0.4533	0.4545	0.4349	0.4338	0.4334	0.4323	0.4321	
Final constant weight	0.4682	0.4411	0.4456	0.4321	0.4227		5	0.4433	0.445	0.4252	0.4242	0.4238	0.4229	0.4227	
Floss Weight	0.0097	0.0116	0.0097	0.0098	0.0101		Wt-floss	2.2652	2.2743	2.1725	2.1675	2.1651	2.1599	2.1588	
W2 (final-floss)	0.4585	0.4295	0.4359	0.4223	0.4126		Mean	0.45304	0.45486	0.4345	0.4335	0.43302	0.43198	0.43176	
							sd	0.018335	0.018319	0.017265	0.017278	0.017197	0.017107	0.017108	
% SOLUBILITY	4.97	4.53	4.43	4.78	4.76		Mean solubility			4.69	0.22				
5mm Group															
Sample	1	2	3	4	5		1	0.5629	0.5655	0.5419	0.5407	0.5399	0.5387	0.5384	0.5382
Start weight	0.5629	0.5409	0.5467	0.5598	0.5597	Floss total	2	0.5409	0.5431	0.5206	0.5191	0.5185	0.5174	0.5168	0.5167
Floss Weight	0.0138	0.0129	0.0114	0.0124	0.012	0.0625	3	0.5467	0.5491	0.5259	0.5246	0.5239	0.5228	0.5223	0.5222
W1 (start-floss)	0.5491	0.528	0.5353	0.5474	0.5477		4	0.5598	0.5616	0.5372	0.5359	0.5353	0.534	0.5336	0.5336
Final constant weight	0.5382	0.5167	0.5222	0.5336	0.5352		5	0.5597	0.5624	0.5388	0.5375	0.5369	0.5357	0.5353	0.5352
Floss Weight	0.0138	0.0129	0.0114	0.0124	0.012		Wt-floss	2.7075	2.7192	2.6019	2.5953	2.592	2.5861	2.5839	2.5834
W2 (final-floss)	0.5244	0.5038	0.5108	0.5212	0.5232		Mean	0.5415	0.54384	0.52038	0.51906	0.5184	0.51722	0.51678	0.51668
							sd	0.009621	0.009696	0.009146	0.009238	0.009208	0.009143	0.009254	0.009241
% SOLUBILITY	4.50	4.58	4.58	4.79	4.47		Mean solubility			4.58	0.12				

Table 80. Fuji II LC One-Month Solubility Experimental Sample Results (grams)

Fuji II ONE MONTH SOLUBILITY (EXPERIMENTAL GROUP)													
		O'Haus Analytical Plus Scale						pre H2O	post H2O				
2mm Group								3-Dec-05	4-Dec-05	5-Dec-05	6-Dec-05	7-Dec-05	8-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2274	0.2291	0.2182	2172	0.2166	0.2168
Start weight	0.2274	0.2416	0.2387	0.3087	0.2401	Floss total	2	0.2416	0.2421	0.2308	0.2294	0.2292	0.2292
Floss Weight	0.0105	0.0113	0.0114	0.0116	0.0119	0.0567	3	0.2387	0.2383	0.2282	0.227	0.2267	0.2273
W1 (start-floss)	0.2169	0.2303	0.2273	0.2971	0.2282		4	0.3087	0.3093	0.2949	0.2931	0.2284	0.2928
Final constant weight	0.2168	0.2292	0.2273	0.2928	0.2289		5	0.2401	0.2407	0.2303	0.2291	2928	0.2289
Floss Weight	0.0105	0.0113	0.0114	0.0116	0.0119		**Wt-floss**	1.1998	1.2028	1.1457	2172.922	0.2289	1.1383
W2 (final-floss)	0.2063	0.2179	0.2159	0.2812	0.217		**Mean**	0.23996	0.24056	0.22914	434.5844	0.04578	0.22766
							sd	0.032574	0.032485	0.030847	971.2385	1309.341	0.030505
% SOLUBILITY	4.89	5.38	5.02	5.35	4.91			**Mean solubility**		**5.11**	**0.24**		
3mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3211	0.3213	0.3067	0.3049	0.3045	0.3045
Start weight	0.3211	0.3551	0.3527	0.3444	0.3365	Floss total	2	0.3551	0.3556	0.3402	0.338	0.3377	0.3377
Floss Weight	0.0083	0.0085	0.0089	0.0088	0.0085	0.043	3	0.3527	0.3519	0.3375	0.3353	0.3349	0.3348
W1 (start-floss)	0.3128	0.3466	0.3438	0.3356	0.328		4	0.3444	0.3457	0.3302	0.3281	0.3275	0.3275
Final constant weight	0.3045	0.3377	0.3348	0.3275	0.3192		5	0.3365	0.3377	0.3214	0.3197	0.3193	0.3192
Floss Weight	0.0083	0.0085	0.0089	0.0088	0.0085		**Wt - floss**	1.6668	1.6692	1.593	1.583	1.5809	1.5807
W2 (final-floss)	0.2962	0.3292	0.3259	0.3187	0.3107		**Mean**	0.33336	0.33384	0.3186	0.3166	0.31618	0.31614
							sd	0.013774	0.013626	0.013583	0.013385	0.013398	0.01339
% SOLUBILITY	5.31	5.02	5.21	5.04	5.27			**Mean solubility**		**5.17**	**0.13**		
4mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4146	0.414	0.3958	0.3932	0.3924	0.3921
Start weight	0.4146	0.4316	0.4132	0.4326	0.4253	Floss total	2	0.4316	0.4319	0.4146	0.412	0.4112	0.4112
Floss Weight	0.0088	0.0086	0.0091	0.0077	0.0089	0.0431	3	0.4132	0.4157	0.3964	0.3939	0.3933	0.3932
W1 (start-floss)	0.4058	0.423	0.4041	0.4249	0.4164		4	0.4326	0.4332	0.4124	0.41	0.4093	0.4093
Final constant weight	0.3921	0.4112	0.3932	0.4093	0.4012		5	0.4253	0.425	0.4042	0.4018	0.4013	0.4012
Floss Weight	0.0088	0.0086	0.0091	0.0077	0.0089		**Wt-floss**	2.0742	2.0767	1.9803	1.9678	1.9644	1.9639
W2 (final-floss)	0.3833	0.4026	0.3841	0.4016	0.3923		**Mean**	0.41484	0.41534	0.39606	0.39356	0.39288	0.39278
							sd	0.009178	0.008901	0.008741	0.00876	0.008732	0.008835
% SOLUBILITY	5.54	4.82	4.95	5.48	5.79			**Mean solubility**		**5.32**	**0.41**		
5mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5452	0.5444	0.5212	0.518	0.5169	0.5168
Start weight	0.5452	0.5473	0.5351	0.5581	0.5456	Floss total	2	0.5473	0.5492	0.5225	0.5189	0.5178	0.5177
Floss Weight	0.0082	0.0087	0.0106	0.0094	0.0089	0.0458	3	0.5351	0.5354	0.5141	0.5107	0.5096	0.5094
W1 (start-floss)	0.537	0.5386	0.5245	0.5487	0.5367		4	0.5581	0.5572	0.5335	0.5302	0.5292	0.5292
Final constant weight	0.5168	0.5177	0.5094	0.5292	0.5171		5	0.5456	0.5465	0.5212	0.518	0.5172	0.5171
Floss Weight	0.0082	0.0087	0.0106	0.0094	0.0089		**Wt-floss**	2.6855	2.6869	2.5667	2.55	2.5449	2.5444
W2 (final-floss)	0.5086	0.509	0.4988	0.5198	0.5082		**Mean**	0.5371	0.53738	0.51334	0.51	0.50898	0.50888
							sd	0.008176	0.007896	0.006981	0.007004	0.007032	0.007102
% SOLUBILITY	5.29	5.50	4.90	5.27	5.31			**Mean solubility**		**5.25**	**0.22**		

Table 81. Fuji II LC One-Month Solubility Control Sample Results (grams)

Fuji II ONE MONTH SOLUBILITY (CONTROL GROUP)																
START: 06 Dec 2006		O'Haus Analytical Plus Scale						pre H2O	post H2O							
2mm Group								6-Dec-05	7-Dec-05	8-Dec-05	9-Dec-05	10-Dec-05	11-Dec-05	12-Dec-05	13-Dec-05	14-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2118	0.2122	0.2035	0.2031	0.2027	0.2023			
Start weight	0.2118	0.2363	0.2414	0.24	0.2431	Floss total	2	0.2363	0.2372	0.2265	0.2259	0.2253	0.2253			
Floss Weight	0.0099	0.0088	0.0105	0.0114	0.0121	0.0527	3	0.2414	0.2415	0.2319	0.2315	0.2309	0.2307			
W1 (start-floss)	0.2019	0.2275	0.2309	0.2286	0.231		4	0.24	0.2405	0.2293	0.2289	0.2284	0.2282			
Final constant weight	0.2023	0.2253	0.2307	0.2282	0.2313		5	0.2431	0.2435	0.2325	0.2321	0.2317	0.2313			
Floss Weight	0.0099	0.0088	0.0105	0.0114	0.0121		**Wt-floss**	1.1199	1.1222	1.071	1.0688	1.0663	1.0651			
W2 (final-floss)	0.1924	0.2165	0.2202	0.2168	0.2192		**Mean**	0.22398	0.22444	0.2142	0.21376	0.21326	0.21302			
							sd	0.0129455	0.0129367	0.012109	0.0121021	0.01205653	0.0121185			
% SOLUBILITY	4.71	4.84	4.63	5.16	5.11			**Mean solubility**		**4.89**	**0.24**					
3mm Group																
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3509	0.3512	0.3365	0.3353	0.3346	0.3341	0.3339	0.3334	0.3335
Start weight	0.3509	0.3278	0.3394	0.3336	0.3426	Floss total	2	0.3278	0.3281	0.3145	0.3136	0.3126	0.3122	0.3124	0.3119	0.3119
Floss Weight	0.0092	0.0085	0.0094	0.0105	0.0094	0.047	3	0.3394	0.3394	0.3254	0.3248	0.3241	0.3236	0.3234	0.3229	0.3229
W1 (start-floss)	0.3417	0.3193	0.33	0.3231	0.3332		4	0.3336	0.3337	0.3196	0.3186	0.3179	0.3175	0.3174	0.3168	0.317
Final constant weight	0.3335	0.3119	0.3229	0.317	0.3264		5	0.3426	0.3429	0.329	0.328	0.3274	0.3268	0.3268	0.3264	0.3264
Floss Weight	0.0092	0.0085	0.0094	0.0105	0.0094		**Wt - floss**	1.6473	1.6483	1.578	1.5733	1.5696	1.5672	1.5669	1.5644	1.5647
W2 (final-floss)	0.3243	0.3034	0.3135	0.3065	0.317		**Mean**	0.32946	0.32966	0.3156	0.31466	0.31392	0.31344	0.31338	0.31288	0.31294
							sd	0.0087925	0.0088189	0.0084826	0.0083909	0.00849688	0.00843759	0.00831998	0.00834847	0.00834943
% SOLUBILITY	5.09	4.98	5.00	5.14	4.86			**Mean solubility**		**5.01**	**0.11**					
4mm Group																
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4492	0.4484	0.4304	0.4289	0.4277	0.427	0.4269	0.4263	0.4264
Start weight	0.4492	0.4519	0.4606	0.439	0.4621	Floss total	2	0.4519	0.4522	0.4334	0.4319	0.431	0.4303	0.4299	0.4294	0.4295
Floss Weight	0.0089	0.0094	0.0096	0.009	0.0084	0.0453	3	0.4606	0.4613	0.4427	0.4409	0.4398	0.4391	0.4389	0.4384	0.4385
W1 (start-floss)	0.4403	0.4425	0.451	0.43	0.4537		4	0.439	0.4404	0.4215	0.4203	0.4193	0.4186	0.4185	0.418	0.418
Final constant weight	0.4264	0.4295	0.4385	0.418	0.4405		5	0.4621	0.4628	0.445	0.4433	0.4421	0.4414	0.4412	0.4406	0.4405
Floss Weight	0.0089	0.0094	0.0096	0.009	0.0084		**Wt-floss**	2.2175	2.2198	2.1277	2.12	2.1146	2.1111	2.1101	2.1074	2.1076
W2 (final-floss)	0.4175	0.4201	0.4289	0.409	0.4321		**Mean**	0.4435	0.44396	0.42554	0.424	0.42292	0.42222	0.42202	0.42148	0.42152
							sd	0.0093709	0.0092937	0.0095454	0.0093246	0.0092686	0.0092686	0.00922887	0.00921293	0.00919277
% SOLUBILITY	5.18	5.06	4.90	4.88	4.76			**Mean solubility**		**4.96**	**0.16**					
5mm Group																
Sample	**1**	**2**	**3**	**4**	**5**		1	0.546	0.5466	0.5255	0.5235	0.5221	0.5212	0.5209	0.5201	0.52
Start weight	0.546	0.5701	0.5644	0.4795	0.5151	Floss total	2	0.5701	0.5758	0.5492	0.5469	0.5456	0.5446	0.5444	0.5437	0.5436
Floss Weight	0.0099	0.0097	0.0098	0.0087	0.0086	0.0467	3	0.5644	0.5668	0.5437	0.5414	0.5401	0.5391	0.5389	0.5381	0.5382
W1 (start-floss)	0.5361	0.5604	0.5546	0.4708	0.5065		4	0.4795	0.4813	0.4601	0.4586	0.4573	0.4566	0.4565	0.4559	0.4588
Final constant weight	0.52	0.5436	0.5382	0.4558	0.4915		5	0.5151	0.5159	0.496	0.4943	0.4932	0.4925	0.4924	0.4914	0.4915
Floss Weight	0.0099	0.0097	0.0098	0.0087	0.0086		**Wt-floss**	2.6284	2.6397	2.5278	2.518	2.5116	2.5073	2.5064	2.5025	2.5054
W2 (final-floss)	0.5101	0.5339	0.5284	0.4471	0.4829		**Mean**	0.52568	0.52794	0.50556	0.5036	0.50232	0.50146	0.50128	0.5005	0.50108
							sd	0.0377281	0.038836	0.0370086	0.0366574	0.0366249	0.03648294	0.03642619	0.03640038	0.03530938
% SOLUBILITY	4.85	4.73	4.72	5.03	4.66			**Mean solubility** ·		**4.80**	**0.15**					

Table 82. Fuji II LC Three-Month Solubility Experimental Sample Results (grams)

Fuji II THREE MONTH SOLUBILITY (EXPERIMENTAL GROUP)													
	O'Haus Analytical Plus Scale							pre H2O	post H2O				
2mm Group								3-Nov-05	4-Nov-05	7-Nov-05	8-Nov-05	9-Nov-05	10-Nov-05
Sample	1	2	3	4	5		1	0.2137	0.2145	0.2051	0.2502		
Start weight	0.2137	0.221	0.2265	0.2196	0.2204	Floss total	2	0.221	0.2217	0.2123	0.2123		
Floss Weight	0.0071	0.008	0.0072	0.0079	0.0079	0.0381	3	0.2265	0.2277	0.2173	0.2173		
W1 (start-floss)	0.2066	0.213	0.2193	0.2117	0.2125		4	0.2196	0.2218	0.2113	0.2114		
Final constant weight	0.2052	0.2123	0.2173	0.2114	0.212		5	0.2204	0.2221	0.2121	0.212		
Floss Weight	0.0071	0.008	0.0072	0.0079	0.0079		Wt-floss	1.0631	1.0697	1.02	1.0651		
W2 (final-floss)	0.1981	0.2043	0.2101	0.2035	0.2041		Mean	0.21262	0.21394	0.204	0.21302		
							sd	0.0045544	0.0046881	0.0043465	0.0166923		
% SOLUBILITY	4.11	4.08	4.20	3.87	3.95			Mean solubility		4.04	0.13		
3mm Group													
Sample	1	2	3	4	5		1	0.3234	0.3256	0.3108	0.3108	0.3109	
Start weight	0.3234	0.2963	0.3074	0.3058	0.3111	Floss total	2	0.2963	0.2995	0.2864	0.2861	0.286	
Floss Weight	0.0081	0.0079	0.0077	0.0074	0.0078	0.0389	3	0.3074	0.3092	0.2939	0.2937	0.2934	
W1 (start-floss)	0.3153	0.2884	0.2997	0.2984	0.3033		4	0.3058	0.3086	0.2934	0.2936	0.293	
Final constant weight	0.3109	0.286	0.2934	0.293	0.2985		5	0.3111	0.313	0.299	0.2988	0.2985	
Floss Weight	0.0081	0.0079	0.0074	0.0074	0.0078		Wt - floss	1.5051	1.517	1.4446	1.4441	1.4429	
W2 (final-floss)	0.3028	0.2781	0.286	0.2856	0.2907		Mean	0.30102	0.3034	0.28892	0.28882	0.28858	
							sd	0.0098191	0.0094637	0.0090681	0.0091397	0.0092651	
% SOLUBILITY	3.96	3.57	4.57	4.29	4.15			Mean solubility		4.11	0.37		
4mm Group													
Sample	1	2	3	4	5		1	0.4148	0.4191	0.399	0.3988	0.3982	0.398
Start weight	0.4148	0.4221	0.4262	0.383	0.4325	Floss total	2	0.4221	0.4275	0.4086	0.4083	0.4076	0.4072
Floss Weight	0.0083	0.0075	0.0071	0.0066	0.0086	0.0381	3	0.4262	0.4293	0.4097	0.4097	0.4089	0.4083
W1 (start-floss)	0.4065	0.4146	0.4191	0.3764	0.4239		4	0.383	0.3852	0.3678	0.3677	0.3671	0.367
Final constant weight	0.398	0.4072	0.4083	0.367	0.4136		5	0.4325	0.4345	0.4144	0.4145	0.4138	0.4136
Floss Weight	0.0083	0.0075	0.0071	0.0066	0.0086		Wt-floss	2.0405	2.0575	1.9614	1.9609	1.9575	1.956
W2 (final-floss)	0.3897	0.3997	0.4012	0.3604	0.405		Mean	0.4081	0.4115	0.39228	0.39218	0.3915	0.3912
							sd	0.0193878	0.0197545	0.0187963	0.0188266	0.0187696	0.01865294
% SOLUBILITY	4.13	3.59	4.27	4.25	4.46			Mean solubility		4.14	0.33		
5mm Group													
Sample	1	2	3	4	5		1	0.5194	0.5253	0.501	0.5008	0.5003	0.4999
Start weight	0.5194	0.4841	0.5421	0.4894	0.5092	Floss total	2	0.4841	0.487	0.4678	0.4674	0.4669	0.4666
Floss Weight	0.0084	0.0073	0.0078	0.008	0.0083	0.0398	3	0.5421	0.545	0.5208	0.5207	0.5201	0.5197
W1 (start-floss)	0.511	0.4768	0.5343	0.4814	0.5009		4	0.4894	0.493	0.4733	0.4727	0.4723	0.4715
Final constant weight	0.4998	0.4665	0.5197	0.4714	0.4904		5	0.5092	0.5133	0.4917	0.4915	0.4909	0.4904
Floss Weight	0.0084	0.0073	0.0078	0.008	0.0083		Wt-floss	2.5044	2.5238	2.4148	2.4133	2.4107	2.4083
W2 (final-floss)	0.4914	0.4592	0.5119	0.4634	0.4821		Mean	0.50088	0.50476	0.48296	0.48266	0.48214	0.48166
							sd	0.0234939	0.0237223	0.0214478	0.0216189	0.0215625	0.02161798
% SOLUBILITY	3.84	3.69	4.19	3.74	3.75			Mean solubility		3.84	0.20		

Table 83. Fuji II LC Three-Month Solubility Control Sample Results (grams)

Fuji II THREE MONTH SOLUBILITY (CONTROL GROUP)													
START: 08 Aug 2005		O'Haus Analytical Plus Scale						pre H2O	post H2O				
2mm Group								8-Nov-05	9-Nov-05	10-Nov-05	11-Nov-05	12-Nov-05	13-Nov-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2224	0.2222	0.212	0.2069	0.2117	0.2119
Start weight	0.2224	0.23	0.233	0.2096	0.2395	Floss total	2	0.23	0.2312	0.2199	0.2193	0.2189	0.2188
Floss Weight	0.0074	0.0075	0.0075	0.0094	0.0087	0.0405	3	0.233	0.2316	0.222	0.2212	0.2211	0.2212
W1 (start-floss)	0.215	0.2225	0.2255	0.2002	0.2308		4	0.2096	0.2107	0.2006	0.2003	0.2001	0.2001
Final constant weight	0.2119	0.2188	0.2212	0.2001	0.2287		5	0.2395	0.2402	0.2296	0.2289	0.2286	0.2287
Floss Weight	0.0074	0.0075	0.0075	0.0074	0.0087		**Wt-floss**	1.094	1.0954	1.0436	1.0361	1.0399	1.0402
W2 (final-floss)	0.2045	0.2113	0.2137	0.1927	0.22		**Mean**	0.2188	0.21908	0.20872	0.20722	0.20798	0.20804
							sd	0.011458	0.011198	0.011022	0.011525	0.010776	0.01079
% SOLUBILITY	4.88	5.03	5.23	3.75	4.68			**Mean solubility**		4.72	0.58		
3mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2973	0.2979	0.2838	0.2832	0.2828	0.2826
Start weight	0.2973	0.2945	0.2936	0.3028	0.2946	Floss total	2	0.2945	0.294	0.2793	0.2787	0.2784	0.2782
Floss Weight	0.0078	0.008	0.0077	0.0066	0.0067	0.0368	3	0.2936	0.2943	0.2816	0.2813	0.2809	0.2806
W1 (start-floss)	0.2895	0.2865	0.2859	0.2962	0.2879		4	0.3028	0.2995	0.2838	0.283	0.2826	0.2825
Final constant weight	0.2826	0.2782	0.2806	0.2825	0.2784		5	0.2946	0.2951	0.2794	0.2789	0.2785	0.2784
Floss Weight	0.0078	0.008	0.0077	0.0066	0.0067		**Wt - floss**	1.446	1.444	1.3711	1.3683	1.3664	1.3655
W2 (final-floss)	0.2748	0.2702	0.2729	0.2759	0.2717		**Mean**	0.2892	0.2888	0.27422	0.27366	0.27328	0.2731
							sd	0.003753	0.00242	0.002225	0.002158	0.002131	0.002128
% SOLUBILITY	5.08	5.69	4.55	6.85	5.63			**Mean solubility**		5.56	0.86		
4mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.454	0.4553	0.4351	0.4337	0.4331	0.4331
Start weight	0.454	0.3436	0.4194	0.427	0.4257	Floss total	2	0.3436	0.3432	0.328	0.3272	0.3267	0.3264
Floss Weight	0.0076	0.0077	0.0072	0.0077	0.0082	0.0384	3	0.4194	0.4208	0.4012	0.3999	0.3995	0.3993
W1 (start-floss)	0.4464	0.3359	0.4122	0.4193	0.4175		4	0.427	0.4274	0.4093	0.4083	0.4076	0.407
Final constant weight	0.4331	0.3264	0.3993	0.4077	0.4076		5	0.4257	0.4259	0.4093	0.4081	0.4077	0.4076
Floss Weight	0.0076	0.0077	0.0072	0.0077	0.0082		**Wt-floss**	2.0313	2.0342	1.9445	1.9388	1.9362	1.935
W2 (final-floss)	0.4255	0.3187	0.3921	0.4	0.3994		**Mean**	0.40626	0.40684	0.3889	0.38776	0.38724	0.387
							sd	0.041507	0.042084	0.04041	0.040206	0.040177	0.040244
% SOLUBILITY	4.68	5.12	4.88	4.60	4.34			**Mean solubility**		4.72	0.29		
5mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5361	0.538	0.5164	0.5148	0.5142	0.514
Start weight	0.5361	0.5183	0.522	0.5312	0.5405	Floss total	2	0.5183	0.5196	0.4972	0.4955	0.4948	0.4947
Floss Weight	0.009	0.0081	0.0077	0.0071	0.007	0.0389	3	0.522	0.5258	0.5013	0.4996	0.4889	0.4989
W1 (start-floss)	0.5271	0.5102	0.5143	0.5241	0.5335		4	0.5312	0.5329	0.511	0.5089	0.5084	0.5085
Final constant weight	0.514	0.4947	0.4989	0.5085	0.5175		5	0.5405	0.5414	0.5202	0.5182	0.5176	0.5175
Floss Weight	0.009	0.0081	0.0077	0.0071	0.007		**Wt-floss**	2.6092	2.6188	2.5072	2.4981	2.485	2.4947
W2 (final-floss)	0.505	0.4866	0.4912	0.5014	0.5105		**Mean**	0.52184	0.52376	0.50144	0.49962	0.497	0.49894
							sd	0.009342	0.008893	0.009779	0.009697	0.012429	0.009721
% SOLUBILITY	4.19	4.63	4.49	4.33	4.31			**Mean solubility**		4.39	0.17		

Table 84. Photac-Fil Quick Immediate Solubility Experimental Sample Results (grams)

Photac Immediate SOLUBILITY (EXPERIMENTAL GROUP)														
		O'Haus Analytical Plus Scale						pre H2O	post H2O					
2mm Group								19-Jan-06	17-Dec-05	18-Dec-05	19-Dec-05	20-Dec-05	21-Dec-05	22-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2564	0.2508	0.2318	0.2307	0.2305		
Start weight	0.2564	0.2526	0.2643	0.2601	0.2705	Floss total	2	0.2526	0.246	0.2275	0.265	0.2262		
Floss Weight	0.0117	0.0116	0.0118	0.0101	0.0113	0.0565	3	0.2643	0.2584	0.2425	0.2413	0.2412		
W1 (start-floss)	0.2447	0.241	0.2525	0.25	0.2592		4	0.2601	0.2662	0.2478	0.2466	0.2463		
Final constant weight	0.2459	0.2409	0.253	0.255	0.2607		5	0.2705	0.2662	0.2447	0.2438	0.2434		
Floss Weight	0.0117	0.0116	0.0118	0.0101	0.0113		**Wt-floss**	1.2474	1.2311	1.1378	1.1709	1.1311		
W2 (final-floss)	0.2342	0.2293	0.2412	0.2449	0.2494		**Mean**	0.24948	0.24622	0.22756	0.23418	0.22622		
							sd	0.006954	0.009074	0.008749	0.01246	0.008698		
% SOLUBILITY	4.29	4.85	4.48	2.04	3.78			**Mean solubility**		**3.89**	**1.10**			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3465	0.3344	0.3125	0.311	0.3106	0.31	
Start weight	0.3465	0.3573	0.3622	0.3482	0.3494	Floss total	2	0.3573	0.3495	0.3266	0.3251	0.3245	0.3241	
Floss Weight	0.0123	0.0122	0.0126	0.0117	0.011	0.0598	3	0.3622	0.3552	0.3332	0.3313	0.3307	0.3302	
W1 (start-floss)	0.3342	0.3451	0.3496	0.3365	0.3384		4	0.3482	0.3572	0.3337	0.332	0.3316	0.331	
Final constant weight	0.3285	0.3394	0.348	0.3372	0.3261		5	0.3494	0.3698	0.3459	0.3441	0.3435	0.3431	
Floss Weight	0.0123	0.0122	0.0126	0.0117	0.011		**Wt-floss**	1.7038	1.7063	1.5921	1.5837	1.5811	1.5786	
W2 (final-floss)	0.3162	0.3272	0.3354	0.3255	0.3151		**Mean**	0.34076	0.34126	0.31842	0.31674	0.31622	0.31572	
							sd	0.006727	0.012871	0.012184	0.012053	0.011993	0.012047	
% SOLUBILITY	5.39	5.19	4.06	3.27	6.89			**Mean solubility**		**4.96**	**1.38**			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4637	0.4387	0.4083	0.4062	0.4054	0.4049	0.4045
Start weight	0.4637	0.4603	0.4625	0.4741	0.4603	Floss total	2	0.4603	0.4521	0.4238	0.4221	0.4211	0.4208	0.4205
Floss Weight	0.0135	0.0129	0.0139	0.0144	0.0123	0.067	3	0.4625	0.4638	0.4325	0.4303	0.4292	0.4287	0.4285
W1 (start-floss)	0.4502	0.4474	0.4486	0.4597	0.448		4	0.4741	0.453	0.423	0.421	0.4204	0.4196	0.4194
Final constant weight	0.433	0.4378	0.44	0.4518	0.434		5	0.4603	0.4816	0.4508	0.4486	0.4472	0.4467	0.4465
Floss Weight	0.0135	0.0129	0.0139	0.0144	0.0123		**Wt-floss**	2.2539	2.2222	2.0714	2.0612	2.0563	2.0537	2.0524
W2 (final-floss)	0.4195	0.4249	0.4261	0.4374	0.4217		**Mean**	0.45078	0.44444	0.41428	0.41224	0.41126	0.41074	0.41048
							sd	0.005735	0.01599	0.015575	0.015499	0.015251	0.015262	0.01533
% SOLUBILITY	6.82	5.03	5.02	4.85	5.87			**Mean solubility**		**5.52**	**0.83**			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5581	0.5536	0.516	0.5135	0.5125	0.5116	0.5116
Start weight	0.5581	0.565	0.556	0.5543	0.5536	Floss total	2	0.565	0.5544	0.5161	0.5139	0.5127	0.5121	0.512
Floss Weight	0.0113	0.011	0.0118	0.0107	0.0112	0.056	3	0.556	0.5682	0.5339	0.5313	0.5301	0.5293	0.529
W1 (start-floss)	0.5468	0.554	0.5442	0.5436	0.5424		4	0.5543	0.5772	0.5421	0.5399	0.5386	0.5379	0.5379
Final constant weight	0.526	0.5377	0.5214	0.5206	0.5272		5	0.5536	0.5616	0.5249	0.5226	0.521	0.5207	0.5206
Floss Weight	0.0113	0.011	0.0118	0.0107	0.0112		**Wt-floss**	2.731	2.759	2.577	2.5652	2.5589	2.5556	2.5551
W2 (final-floss)	0.5147	0.5267	0.5096	0.5099	0.516		**Mean**	0.5462	0.5518	0.5154	0.51304	0.51178	0.51112	0.51102
							sd	0.00459	0.009912	0.011391	0.011402	0.011337	0.01133	0.01131
% SOLUBILITY	5.87	4.93	6.36	6.20	4.87			**Mean solubility**		**5.64**	**0.70**			

Table 85. Photac-Fil Quick Immediate Solubility Control Sample Results (grams)

Photac Fil Quick IMMEDIATE SOLUBILITY CONTROL													
	O'Haus Analytical Plus Scale												
								pre H2O	post H2O				
2mm Group								16-Dec-05	17-Dec-05	18-Dec-05	19-Dec-05	20-Dec-05	21-Dec-05	22-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2403	0.2508	0.2318	0.2307	0.2305		
Start weight	0.2403	0.2367	0.2499	0.2546	0.2531	Floss total	2	0.2367	0.246	0.2275	0.2265	0.2262		
Floss Weight	0.0117	0.0121	0.0117	0.0096	0.0105	0.0556	3	0.2499	0.2584	0.2425	0.2413	0.2412		
W1 (start-floss)	0.2286	0.2246	0.2382	0.245	0.2426		4	0.2546	0.2662	0.2478	0.2466	0.2463		
Final constant weight	0.2305	0.2262	0.2412	0.2463	0.2434		5	0.2531	0.2662	0.2447	0.2438	0.2434		
Floss Weight	0.0117	0.0121	0.0117	0.0096	0.0105		**Wt-floss**	1.179	1.232	1.1387	1.1333	1.132		
W2 (final-floss)	0.2188	0.2141	0.2295	0.2367	0.2329		**Mean**	0.2358	0.2464	0.22774	0.22666	0.2264		
							sd	0.007974	0.009074	0.008749	0.008715	0.008698		
% SOLUBILITY	4.29	4.67	3.65	3.39	4.00			**Mean solubility**		4.00	0.51			
3mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3214	0.3344	0.3125	0.311	0.3106	0.31	
Start weight	0.3214	0.336	0.3436	0.3425	0.3539	Floss total	2	0.336	0.3495	0.3266	0.3251	0.3245	0.3241	
Floss Weight	0.0112	0.0122	0.011	0.0109	0.01	0.0553	3	0.3436	0.3552	0.3332	0.3313	0.3307	0.3302	
W1 (start-floss)	0.3102	0.3238	0.3326	0.3316	0.3439		4	0.3425	0.3572	0.3337	0.332	0.3316	0.331	
Final constant weight	0.31	0.3241	0.3302	0.331	0.3431		5	0.3539	0.3698	0.3459	0.3441	0.3435	0.3431	
Floss Weight	0.0112	0.0122	0.011	0.0109	0.01		**Wt-floss**	1.6421	1.7108	1.5966	1.5882	1.5856	1.5831	
W2 (final-floss)	0.2988	0.3119	0.3192	0.3201	0.3331		**Mean**	0.32842	0.34216	0.31932	0.31764	0.31712	0.31662	
							sd	0.011969	0.012871	0.012184	0.012053	0.011993	0.012047	
% SOLUBILITY	3.68	3.68	4.03	3.47	3.14			**Mean solubility**		3.60	0.33			
4mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4201	0.4387	0.4083	0.4062	0.4054	0.4049	0.4045
Start weight	0.4201	0.4352	0.4451	0.4344	0.4618	Floss total	2	0.4352	0.4521	0.4258	0.4221	0.4211	0.4208	0.4205
Floss Weight	0.0103	0.0096	0.0119	0.0112	0.0112	0.0542	3	0.4451	0.4638	0.4325	0.4303	0.4292	0.4287	0.4285
W1 (start-floss)	0.4098	0.4256	0.4332	0.4232	0.4506		4	0.4344	0.453	0.423	0.421	0.4204	0.4196	0.4194
Final constant weight	0.4045	0.4205	0.4285	0.4194	0.4465		5	0.4618	0.4816	0.4508	0.4486	0.4472	0.4467	0.4465
Floss Weight	0.0103	0.0096	0.0119	0.0112	0.0112		**Wt-floss**	2.1424	2.235	2.0862	2.074	2.0691	2.0665	2.0652
W2 (final-floss)	0.3942	0.4109	0.4166	0.4082	0.4353		**Mean**	0.42848	0.447	0.41724	0.4148	0.41382	0.4133	0.41304
							sd	0.015406	0.01599	0.015476	0.015499	0.015251	0.015262	0.0153304
% SOLUBILITY	3.81	3.45	3.83	3.54	3.40			**Mean solubility**		3.61	0.20			
5mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5293	0.5536	0.516	0.5135	0.5125	0.5116	0.5116
Start weight	0.5293	0.5301	0.5461	0.5546	0.5381	Floss total	2	0.5301	0.5544	0.5161	0.5139	0.5127	0.5121	0.512
Floss Weight	0.0115	0.0114	0.0097	0.0086	0.0101	0.0513	3	0.5461	0.5682	0.5339	0.5313	0.5301	0.5293	0.529
W1 (start-floss)	0.5178	0.5187	0.5364	0.546	0.528		4	0.5546	0.5772	0.5421	0.5399	0.5386	0.5379	0.5379
Final constant weight	0.5116	0.512	0.529	0.5379	0.5206		5	0.5381	0.5616	0.5249	0.5226	0.5211	0.5207	0.5206
Floss Weight	0.0115	0.0114	0.0097	0.0086	0.0101		**Wt-floss**	2.6469	2.7637	2.5817	2.5699	2.5637	2.5603	2.5598
W2 (final-floss)	0.5001	0.5006	0.5193	0.5293	0.5105		**Mean**	0.52938	0.55274	0.51634	0.51398	0.51274	0.51206	0.51196
							sd	0.010792	0.009912	0.011391	0.011402	0.011333	0.01133	0.0113103
% SOLUBILITY	3.42	3.49	3.19	3.06	3.31			**Mean solubility**		3.29	0.17			

Table 86. Photac-Fil Quick 24-Hour Solubility Experimental Sample Results (grams)

PHOTAC 24 hour SOLUBILITY (EXPERIMENTAL GROUP)															
		O'Haus Analytical Plus Scale						pre H2O	post H2O						
2mm Group								4-Feb-06	5-Feb-06	6-Feb-06	7-Feb-06	8-Feb-06	9-Feb-06	10-Feb-06	11-Feb-06
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2257	0.2267	0.2088	0.2074	0.2072	0.2072		
Start weight	0.2257	0.2298	0.2356	0.2414	0.2554	Floss total	2	0.2298	0.2313	0.2136	0.2123	0.212	0.212		
Floss Weight	0.0097	0.0111	0.0092	0.0091	0.0114	0.0505	3	0.2356	0.2367	0.2206	0.2192	0.2189	0.2189		
W1 (start-floss)	0.216	0.2187	0.2264	0.2323	0.244		4	0.2414	0.2426	0.225	0.2234	0.2232	0.2232		
Final constant weight	0.2072	0.212	0.2189	0.2232	0.2361		5	0.2554	0.257	0.2379	0.2366	0.2363	0.2361		
Floss Weight	0.0097	0.0111	0.0092	0.0091	0.0114		**Wt-floss**	1.1374	1.1438	1.0554	1.0484	1.0471	1.0469		
W2 (final-floss)	0.1975	0.2009	0.2097	0.2141	0.2247		**Mean**	0.22748	0.22876	0.21108	0.20968	0.20942	0.20938		
							sd	0.0115945	0.0117551	0.0112384	0.0112424	0.0112231	0.0111484		
% SOLUBILITY	8.56	8.14	7.38	7.83	7.91			**Mean solubility**		7.96	0.43				
3mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.367	0.371	0.3454	0.3432	0.3426	0.3423		
Start weight	0.367	0.3693	0.3472	0.3045	0.3615	Floss total	2	0.3693	0.3724	0.3512	0.349	0.3485	0.3483		
Floss Weight	0.0108	0.0104	0.0118	0.0102	0	0.0432	3	0.3472	0.35	0.3273	0.3253	0.3246	0.3242		
W1 (start-floss)	0.3562	0.3589	0.3354	0.2943	0.3615		4	0.3045	0.3065	0.2851	0.2834	0.2829	0.2826		
Final constant weight	0.3423	0.3483	0.3242	0.2826	0.3405		5	0.3615	0.3641	0.3435	0.3413	0.3409	0.3405		
Floss Weight	0.0108	0.0104	0.0118	0.0102	0		**Wt - floss**	1.7063	1.7208	1.6093	1.599	1.5963	1.5947		
W2 (final-floss)	0.3315	0.3379	0.3124	0.2724	0.3405		**Mean**	0.34126	0.34416	0.32186	0.3198	0.31926	0.31894		
							sd	0.0267945	0.0273616	0.0268835	0.0266665	0.0266709	0.0266812		
% SOLUBILITY	6.93	5.85	6.86	7.44	5.81			**Mean solubility**		6.58	0.72				
4mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4549	0.4665	0.4374	0.4356	0.4348	0.4345	0.4339	0.4337
Start weight	0.4595	0.4566	0.4612	0.4257	0.4444	Floss total	2	0.4346	0.4623	0.434	0.4322	0.4316	0.4313	0.4307	0.4308
Floss Weight	0.0096	0.0094	0.0102	0.0096	0.0101	0.0489	3	0.4625	0.4625	0.4373	0.4357	0.435	0.4348	0.4343	0.434
W1 (start-floss)	0.4499	0.4472	0.451	0.4161	0.4343		4	0.4402	0.4318	0.4008	0.3992	0.3987	0.3984	0.3978	0.3975
Final constant weight	0.4337	0.4308	0.434	0.3975	0.4198		5	0.4501	0.4522	0.4233	0.4215	0.4208	0.4204	0.4198	0.4198
Floss Weight	0.0096	0.0094	0.0102	0.0096	0.0101		**Wt-floss**	2.1934	2.2264	2.0839	2.0753	2.072	2.0705	2.0676	2.0669
W2 (final-floss)	0.4241	0.4214	0.4238	0.3879	0.4097		**Mean**	0.43868	0.44528	0.41678	0.41506	0.4144	0.4141	0.41352	0.41338
							sd	0.0111983	0.0140344	0.0155114	0.0154633	0.015375	0.0153983	0.01541606	0.0154652
% SOLUBILITY	5.73	5.77	6.03	6.78	5.66			**Mean solubility**		6.00	0.46				
5mm Group															
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5246	0.5331	0.5008	0.4988	0.498	0.4971	0.4965	0.4969
Start weight	0.5246	0.5206	0.55	0.5201	0.5284	Floss total	2	0.5206	0.526	0.4937	0.4917	0.4911	0.4901	0.4895	0.4899
Floss Weight	0.0116	0.0097	0.0108	0.0085	0.0105	0.0511	3	0.55	0.5577	0.5254	0.5234	0.5227	0.5218	0.521	0.5213
W1 (start-floss)	0.513	0.5109	0.5392	0.5116	0.5179		4	0.5201	0.5285	0.4939	0.4919	0.4912	0.4903	0.4895	0.4898
Final constant weight	0.4969	0.4899	0.5213	0.4898	0.4967		5	0.5284	0.5372	0.501	0.4988	0.4981	0.4372	0.4963	0.4967
Floss Weight	0.0116	0.0097	0.0108	0.0085	0.0105		**Wt-floss**	2.5926	2.6314	2.4637	2.4535	2.45	2.3854	2.4417	2.4435
W2 (final-floss)	0.4853	0.4802	0.5105	0.4813	0.4862		**Mean**	0.51852	0.52628	0.49274	0.4907	0.49	0.47708	0.48834	0.4887
							sd	0.0123506	0.0126069	0.0130374	0.0130452	0.0130318	0.0308753	0.0130103	0.0129847
% SOLUBILITY	5.40	6.01	5.32	5.92	6.12			**Mean solubility**		5.75	0.37				

Table 87. Photac-Fil Quick 24-Hour Solubility Control Sample Results (grams)

PHOTAC 24 hour SOLUBILITY (CONTROL GROUP)																
		O'Haus Analytical Plus Scale						pre H2O	post H2O							
2mm Group								1-Feb-06	2-Feb-06	3-Feb-06	4-Feb-06	5-Feb-06	6-Feb-06	7-Feb-06	8-Feb-06	9-Feb-06
Sample	1	2	3	4	5		1	0.238	0.2403	0.225	0.2238	0.2234				
Start weight	0.238	0.232	0.2372	0.2433	0.2626	Floss total	2	0.232	0.2346	0.2204	0.2193	0.219				
Floss Weight	0.0102	0.0094	0.0106	0.0095	0.0103	0.05	3	0.2372	0.2389	0.2246	0.2233	0.223				
W1 (start-floss)	0.2278	0.2226	0.2266	0.2338	0.2523		4	0.2433	0.2446	0.231	0.2296	0.2294				
Final constant weight	0.2234	0.219	0.223	0.2294	0.2485		5	0.2626	0.2644	0.2504	0.2489	0.2485				
Floss Weight	0.0102	0.0094	0.0106	0.0095	0.0103		Wt-floss	1.1631	1.1728	1.1014	1.0949	1.0933				
W2 (final-floss)	0.2132	0.2096	0.2124	0.2199	0.2382		Mean	0.23262	0.23456	0.22028	0.21898	0.21866				
							sd	0.011866	0.0116513	0.0118647	0.0117259	0.0116961				
% SOLUBILITY	6.41	5.84	6.27	5.95	5.59			Mean solubility		6.01	0.33					
3mm Group																
Sample	1	2	3	4	5		1	0.3681	0.3737	0.3523	0.3497	0.3489	0.3487			
Start weight	0.3681	0.3683	0.3673	0.3438	0.3677	Floss total	2	0.3683	0.3743	0.3538	0.3516	0.3508	0.3507			
Floss Weight	0.0096	0.0097	0.0097	0.0113	0.0107	0.051	3	0.3673	0.3733	0.3527	0.3503	0.3495	0.349			
W1 (start-floss)	0.3585	0.3586	0.3576	0.3325	0.357		4	0.3438	0.3486	0.3285	0.3264	0.3259	0.3256			
Final constant weight	0.3487	0.3507	0.349	0.3256	0.345		5	0.3677	0.3724	0.3489	0.3461	0.3454	0.345			
Floss Weight	0.0096	0.0097	0.0097	0.0113	0.0107		Wt - floss	1.7642	1.7913	1.6852	1.6731	1.6695	1.668			
W2 (final-floss)	0.3391	0.341	0.3393	0.3143	0.3343		Mean	0.35284	0.35826	0.33704	0.33462	0.3339	0.3336			
							sd	0.010762	0.0111235	0.0106348	0.010497	0.0103685	0.0103844			
% SOLUBILITY	5.41	4.91	5.12	5.47	6.36			Mean solubility		5.45	0.55					
4mm Group																
Sample	1	2	3	4	5		1	0.4549	0.4621	0.4378	0.4346	0.4332	0.4325	0.4309	0.4312	0.4311
Start weight	0.4549	0.4346	0.4625	0.4402	0.4501	Floss total	2	0.4346	0.4407	0.4184	0.4156	0.4149	0.4144	0.4138	0.4134	0.4132
Floss Weight	0.0095	0.0105	0.0104	0.0093	0.0091	0.0488	3	0.4625	0.4708	0.4452	0.4422	0.4414	0.4408	0.4398	0.4396	0.4394
W1 (start-floss)	0.4454	0.4241	0.4521	0.4309	0.441		4	0.4402	0.449	0.4222	0.4194	0.4185	0.418	0.4174	0.4169	0.4167
Final constant weight	0.4311	0.4132	0.4394	0.4167	0.4261		5	0.4501	0.4564	0.4317	0.4288	0.4279	0.4273	0.4264	0.4261	0.4261
Floss Weight	0.0095	0.0105	0.0104	0.0093	0.0091		Wt-floss	2.1935	2.2302	2.1065	2.0918	2.0871	2.0842	2.0795	2.0784	2.0777
W2 (final-floss)	0.4216	0.4027	0.429	0.4074	0.417		Mean	0.4387	0.44604	0.4213	0.41836	0.41742	0.41684	0.4159	0.41568	0.41554
							sd	0.011198	0.0116114	0.0110063	0.0108799	0.0107832	0.0107208	0.0104503	0.0106303	0.0106473
% SOLUBILITY	5.34	5.05	5.11	5.45	5.44			Mean solubility		5.28	0.19					
5mm Group																
Sample	1	2	3	4	5		1	0.5364	0.5453	0.5195	0.5157	0.5147	0.5139	0.5127	0.5125	0.5122
Start weight	0.5364	0.5222	0.5309	0.5402	0.5579	Floss total	2	0.5222	0.5301	0.5014	0.4982	0.4971	0.4964	0.4953	0.4948	0.4948
Floss Weight	0.0093	0.0102	0.0087	0.0103	0.0092	0.0477	3	0.5309	0.5388	0.5127	0.5091	0.5081	0.5074	0.5065	0.5059	0.5058
W1 (start-floss)	0.5271	0.512	0.5222	0.5299	0.5487		4	0.5402	0.5464	0.5214	0.5181	0.517	0.5164	0.5154	0.5149	0.5148
Final constant weight	0.5122	0.4948	0.5058	0.5148	0.5212		5	0.5579	0.5621	0.5295	0.5253	0.5242	0.523	0.5219	0.5214	0.5212
Floss Weight	0.0093	0.0102	0.0087	0.0103	0.0092		Wt-floss	2.6399	2.675	2.5368	2.5187	2.5134	2.5094	2.5041	2.5018	2.5011
W2 (final-floss)	0.5029	0.4846	0.4971	0.5045	0.512		Mean	0.52798	0.535	0.50736	0.50374	0.50268	0.50188	0.50082	0.50036	0.50022
							sd	0.013251	0.011767	0.0105316	0.010228	0.0102238	0.0100847	0.0100716	0.0100998	0.0100214
% SOLUBILITY	4.59	5.35	4.81	4.79	6.69			Mean solubility		5.25	0.85					

Table 88. Photac-Fil Quick One-Week Solubility Experimental Sample Results (grams)

Photac Fil Quick ONE WEEK SOLUBILITY EXPERIMENTAL														
	O'Haus Analytical Plus Scale													
								pre H2O	post H2O					
2mm Group								8-Dec-05	9-Dec-05	10-Dec-05	11-Dec-05	12-Dec-05	13-Dec-05	14-Dec-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2246	0.2248	0.2116	0.2104	0.2102		
Start weight	0.2246	0.2365	0.2523	0.2331	0.2541	Floss total	2	0.2365	0.237	0.2231	0.2223	0.222		
Floss Weight	0.0099	0.0113	0.0106	0.0106	0.0119	0.0543	3	0.2523	0.2566	0.2436	0.2426	0.2422		
W1 (start-floss)	0.2147	0.2252	0.2417	0.2225	0.2422		4	0.2331	0.2347	0.2196	0.2188	0.2184		
Final constant weight	0.2102	0.222	0.2422	0.2184	0.2385		5	0.2541	0.255	0.2395	0.2386	0.2385		
Floss Weight	0.0099	0.0113	0.0106	0.0106	0.0119		**Wt-floss**	1.1463	1.1538	1.0831	1.0784	1.077		
W2 (final-floss)	0.2003	0.2107	0.2316	0.2078	0.2266		**Mean**	0.22926	0.23076	0.21662	0.21568	0.2154		
							sd	0.0127186	0.0137438	0.01358113	0.01361756	0.01361756		
% SOLUBILITY	6.71	6.44	4.18	6.61	6.44			**Mean solubility**		**6.07**	**1.07**			
3mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.3519	0.3524	0.3319	0.3303	0.3299	0.3292	0.3294
Start weight	0.3519	0.3174	0.3438	0.3207	0.328	Floss total	2	0.3174	0.3185	0.2989	0.2977	0.2972	0.2965	0.2967
Floss Weight	0.0111	0.0091	0.0101	0.011	0.0101	0.0514	3	0.3438	0.344	0.3242	0.3228	0.3222	0.3215	0.3215
W1 (start-floss)	0.3408	0.3083	0.3337	0.3097	0.3179		4	0.3207	0.3218	0.3014	0.2998	0.2993	0.2986	0.2988
Final constant weight	0.3294	0.2967	0.3215	0.2988	0.3059		5	0.328	0.329	0.3087	0.307	0.3066	0.3059	0.3059
Floss Weight	0.0111	0.0091	0.0101	0.011	0.0101		**Wt-floss**	1.6104	1.6143	1.5137	1.5062	1.5038	1.5003	1.5009
W2 (final-floss)	0.3183	0.2876	0.3114	0.2878	0.2958		**Mean**	0.32208	0.32286	0.30274	0.30124	0.30076	0.30006	0.30018
							sd	0.0149286	0.0145684	0.01444393	0.01439364	0.01439906	0.01439906	0.01437613
% SOLUBILITY	6.60	6.71	6.68	7.07	6.95			**Mean solubility**		**6.80**	**0.20**			
4mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4372	0.4378	0.4143	0.4122	0.4115	0.4105	0.4107
Start weight	0.4372	0.4091	0.4685	0.4119	0.4684	Floss total	2	0.4091	0.4108	0.386	0.3841	0.3835	0.3826	0.3828
Floss Weight	0.0118	0.0124	0.0118	0.0117	0.0126	0.0603	3	0.4685	0.4709	0.4472	0.4445	0.4438	0.4427	0.4427
W1 (start-floss)	0.4254	0.3967	0.4567	0.4002	0.4558		4	0.4119	0.4132	0.3915	0.3891	0.3886	0.3876	0.3876
Final constant weight	0.4107	0.3828	0.4427	0.3876	0.4403		5	0.4684	0.4689	0.4444	0.4419	0.4412	0.4402	0.4403
Floss Weight	0.0118	0.0124	0.0118	0.0117	0.0126		**Wt-floss**	2.1348	2.1413	2.0231	2.0115	2.0083	2.0033	2.0038
W2 (final-floss)	0.3989	0.3704	0.4309	0.3759	0.4277		**Mean**	0.42696	0.42826	0.40462	0.4023	0.40166	0.40066	0.40076
							sd	0.0290098	0.0290053	0.02863926	0.02839574	0.02832467	0.02827149	0.02823875
% SOLUBILITY	6.23	6.63	5.65	6.07	6.16			**Mean solubility**		**6.15**	**0.35**			
5mm Group														
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5571	0.5588	0.5293	0.5264	0.5253	0.5239	0.5238
Start weight	0.5571	0.5784	0.5353	0.5461	0.5541	Floss total	2	0.5784	0.5802	0.5477	0.5445	0.5433	0.542	0.542
Floss Weight	0.0102	0.0122	0.0102	0.0111	0.0114	0.0551	3	0.5353	0.5377	0.5071	0.5045	0.5035	0.5021	0.5021
W1 (start-floss)	0.5469	0.5662	0.5251	0.535	0.5427		4	0.5461	0.5468	0.5165	0.5133	0.5122	0.5108	0.5109
Final constant weight	0.5238	0.542	0.5021	0.5109	0.5208		5	0.5541	0.5551	0.5262	0.5231	0.5221	0.5209	0.5208
Floss Weight	0.0102	0.0122	0.0102	0.0111	0.0114		**Wt-floss**	2.7159	2.7235	2.5717	2.5567	2.5513	2.5446	2.5445
W2 (final-floss)	0.5136	0.5298	0.4919	0.4998	0.5094		**Mean**	0.54318	0.5447	0.51434	0.51134	0.51026	0.50892	0.5089
							sd	0.0159443	0.0159172	0.01522524	0.01506745	0.0150024	0.01504204	0.01501889
% SOLUBILITY	6.09	6.43	6.32	6.58	6.14			**Mean solubility**		**6.31**	**0.20**			

Table 89. Photac-Fil Quick One-Week Solubility Control Sample Results (grams)

PHOTAC ONE WEEK SOLUBILITY (Control GROUP)																
		O'Haus Analytical Plus Scale						pre H2O	post H2O							
2mm Group								4-Jan-06	5-Jan-06	6-Jan-06	7-Jan-06	8-Jan-06	9-Jan-06	10-Jan-06	11-Jan-06	12-Jan-06
Sample	1	2	3	4	5		1	0.2236	0.2255	0.2138	0.2126	0.2124	0.2123			
Start weight	0.2236	0.2463	0.2553	0.2339	0.2295	Floss total	2	0.2463	0.248	0.2345	0.2331	0.2327	0.2326			
Floss Weight	0.0126	0.0111	0.0103	0.0099	0.0096	0.0535	3	0.2553	0.2558	0.2438	0.2415	0.2415	0.2413			
W1 (start-floss)	0.211	0.2352	0.245	0.224	0.2199		4	0.2339	0.2343	0.2227	0.2209	0.2205	0.2205			
Final constant weight	0.2123	0.2326	0.2413	0.2205	0.2151		5	0.2295	0.2291	0.2175	0.2157	0.2152	0.2151			
Floss Weight	0.0126	0.0111	0.0103	0.0099	0.0096		Wt-floss	1.1351	1.1392	1.0788	1.0703	1.0688	1.0683			
W2 (final-floss)	0.1997	0.2215	0.231	0.2106	0.2055		Mean	0.22702	0.22784	0.21576	0.21406	0.21376	0.21366			
							sd	0.0128861	0.0128893	0.01245	0.0121925	0.0122997	0.0122572			
% SOLUBILITY	5.36	5.82	5.71	5.98	6.55			Mean solubility		5.89	0.44					
3mm Group																
Sample	1	2	3	4	5		1	0.3546	0.3572	0.3401	0.3374	0.3367	0.3366			
Start weight	0.3546	0.3305	0.321	0.3371	0.3304	Floss total	2	0.3305	0.3338	0.3179	0.3152	0.3145	0.3143			
Floss Weight	0.0111	0.0093	0.0103	0.0092	0.0096	0.0495	3	0.321	0.3214	0.3052	0.3029	0.3023	0.3021			
W1 (start-floss)	0.3435	0.3212	0.3107	0.3279	0.3208		4	0.3371	0.3386	0.3237	0.321	0.3206	0.3205			
Final constant weight	0.3366	0.3143	0.3021	0.3205	0.3104		5	0.3304	0.3219	0.3138	0.3112	0.3106	0.3104			
Floss Weight	0.0111	0.0093	0.0103	0.0092	0.0096		Wt - floss	1.6241	1.6234	1.5512	1.5382	1.5352	1.5344			
W2 (final-floss)	0.3255	0.305	0.2918	0.3113	0.3008		Mean	0.32482	0.32468	0.31024	0.30764	0.30704	0.30688			
							sd	0.0125059	0.0146878	0.0130335	0.0129073	0.0128873	0.0129328			
% SOLUBILITY	5.24	5.04	6.08	5.06	6.23			Mean solubility		5.53	0.58					
4mm Group																
Sample	1	2	3	4	5		1	0.4544	0.4578	0.435	0.431	0.4301	0.4298	0.4282	0.4278	0.4279
Start weight	0.4544	0.4463	0.4434	0.4371	0.4633	Floss total	2	0.4463	0.4481	0.4276	0.4232	0.4226	0.4224	0.4206	0.4206	0.4204
Floss Weight	0.01	0.0101	0.0102	0.0103	0.0106	0.0512	3	0.4434	0.4434	0.4244	0.4205	0.4198	0.4196	0.4182	0.4176	0.4175
W1 (start-floss)	0.4444	0.4362	0.4332	0.4268	0.4527		4	0.4371	0.4372	0.4166	0.4128	0.4121	0.4119	0.4104	0.4101	0.41
Final constant weight	0.4279	0.4204	0.4175	0.41	0.4392		5	0.4633	0.4664	0.4461	0.4421	0.4413	0.408	0.4397	0.4392	0.4392
Floss Weight	0.01	0.0101	0.0102	0.0103	0.0106		Wt-floss	2.1933	2.2017	2.0985	2.0784	2.0747	2.0405	2.0659	2.0641	2.0638
W2 (final-floss)	0.4179	0.4103	0.4073	0.3997	0.4286		Mean	0.43866	0.44034	0.4197	0.41568	0.41494	0.4081	0.41318	0.41282	0.41276
							sd	0.0101718	0.0116096	0.0111901	0.0111412	0.0110764	0.0086283	0.01109739	0.0110317	0.01109572
% SOLUBILITY	5.96	5.94	5.98	6.35	5.32			Mean solubility		5.91	0.37					
5mm Group																
Sample	1	2	3	4	5		1	0.5461	0.5499	0.5266	0.5219	0.5205	0.5199	0.5186	0.5179	0.5178
Start weight	0.5461	0.5513	0.5194	0.5498	0.5602	Floss total	2	0.5513	0.5547	0.5295	0.525	0.5236	0.5233	0.5217	0.5211	0.5211
Floss Weight	0.0128	0.0113	0.0096	0.0097	0.0127	0.0561	3	0.5194	0.522	0.4969	0.4922	0.4898	0.4896	0.4882	0.4875	0.4875
W1 (start-floss)	0.5333	0.54	0.5098	0.5401	0.5475		4	0.5498	0.5539	0.5288	0.5246	0.5232	0.5229	0.5213	0.5207	0.5206
Final constant weight	0.5178	0.5211	0.4875	0.5206	0.5273		5	0.5602	0.5619	0.5358	0.5313	0.5302	0.5298	0.5282	0.5274	0.5273
Floss Weight	0.0128	0.0113	0.0096	0.0097	0.0127		Wt-floss	2.6707	2.6863	2.5615	2.5389	2.5312	2.5294	2.5219	2.5185	2.5182
W2 (final-floss)	0.505	0.5098	0.4779	0.5109	0.5146		Mean	0.53414	0.53726	0.5123	0.50778	0.50624	0.50588	0.50438	0.5037	0.50364
							sd	0.0154085	0.0154221	0.0152688	0.0153729	0.0158688	0.0157913	0.01571798	0.0157169	0.01568321
% SOLUBILITY	5.31	5.59	6.26	5.41	6.01			Mean solubility		5.71	0.41					

Table 90. Photac-Fil Quick One-Month Solubility Experimental Sample Results (grams)

PHOTAC ONE MONTH SOLUBILITY (EXPERIMENTAL GROUP)															
		O'Haus Analytical Plus Scale						pre H2O	post H2O						
2mm Group								7-Dec-05	8-Dec-05	9-Dec-05	10-Dec-05	11-Dec-05	12-Dec-05	13-Dec-05	14-Dec-05
Sample	1	2	3	4	5		1	0.2266	0.2273	0.2129	0.2118	0.2117			
Start weight	0.2266	0.2244	0.216	0.2258	0.2265	Floss total	2	0.2244	0.254	0.2098	0.2089	0.2088			
Floss Weight	0.0101	0.0098	0.0104	0.0107	0.0102	0.0512	3	0.216	0.2167	0.2032	0.2021	0.202			
W1 (start-floss)	0.2165	0.2146	0.2056	0.2151	0.2163		4	0.2258	0.2264	0.2122	0.2112	0.211			
Final constant weight	0.2117	0.2088	0.202	0.211	0.2092		5	0.2265	0.2247	0.2103	0.2093	0.2092			
Floss Weight	0.0101	0.0098	0.0104	0.0107	0.0102		Wt-floss	1.0681	1.0979	0.9972	0.9921	0.9915			
W2 (final-floss)	0.2016	0.199	0.1916	0.2003	0.199		Mean	0.21362	0.21958	0.19944	0.19842	0.1983			
							sd	0.0044808	0.0141516	0.0038441	0.00386691	0.00385071			
% SOLUBILITY	6.88	7.27	6.81	6.88	8.00			Mean solubility		7.17	0.50				
3mm Group															
Sample	1	2	3	4	5		1	0.3437	0.3445	0.3262	0.3247	0.3243	0.3237	0.3232	0.3232
Start weight	0.3437	0.3389	0.3444	0.336	0.3581	Floss total	2	0.3389	0.3387	0.3219	0.3204	0.3199	0.3195	0.319	0.319
Floss Weight	0.0091	0.0098	0.0083	0.0078	0.0081	0.0431	3	0.3444	0.3447	0.3273	0.3257	0.3146	0.3248	0.3242	0.3224
W1 (start-floss)	0.3346	0.3291	0.3361	0.3282	0.35		4	0.336	0.3353	0.3165	0.3151	0.3379	0.3144	0.3137	0.3138
Final constant weight	0.3232	0.319	0.3224	0.3138	0.3371		5	0.3581	0.358	0.3403	0.3386	0.3396	0.3375	0.3369	0.3371
Floss Weight	0.0091	0.0098	0.0083	0.0078	0.0081		Wt - floss	1.678	1.6781	1.5891	1.5814	1.5932	1.5768	1.5739	1.5724
W2 (final-floss)	0.3141	0.3092	0.3141	0.306	0.329		Mean	0.3356	0.33562	0.31782	0.31628	0.31864	0.31536	0.31478	0.31448
							sd	0.0084975	0.0086636	0.0088362	0.00872726	0.01105319	0.00859343	0.00860785	0.00865737
% SOLUBILITY	6.13	6.05	6.55	6.76	6.00			Mean solubility		6.30	0.34				
4mm Group															
Sample	1	2	3	4	5		1	0.4645	0.4632	0.4379	0.4356	0.4346	0.4342	0.4334	0.4334
Start weight	0.4645	0.438	0.4342	0.428	0.426	Floss total	2	0.438	0.4373	0.413	0.4108	0.4099	0.4095	0.4086	0.4087
Floss Weight	0.0096	0.0098	0.0103	0.0108	0.009	0.0495	3	0.4342	0.4331	0.4115	0.4091	0.4083	0.4079	0.4069	0.407
W1 (start-floss)	0.4549	0.4282	0.4239	0.4172	0.417		4	0.428	0.4263	0.4029	0.4007	0.3999	0.3994	0.3988	0.3988
Final constant weight	0.4334	0.4087	0.407	0.3988	0.3976		5	0.426	0.4234	0.4014	0.3992	0.3985	0.3982	0.3975	0.3976
Floss Weight	0.0096	0.0098	0.0103	0.0108	0.009		Wt-floss	2.1412	2.1338	2.0172	2.0059	2.0017	1.9997	1.9957	1.996
W2 (final-floss)	0.4238	0.3989	0.3967	0.388	0.3886		Mean	0.42824	0.42676	0.40344	0.40118	0.40034	0.39994	0.39914	0.3992
							sd	0.0154967	0.0158162	0.014648	0.01461256	0.01450889	0.01450665	0.01445867	0.01443433
% SOLUBILITY	6.84	6.84	6.42	7.00	6.81			Mean solubility		6.78	0.22				
5mm Group															
Sample	1	2	3	4	5		1	0.5384	0.5362	0.5067	0.5036	0.5024	0.5022	0.5011	0.5015
Start weight	0.5384	0.5457	0.5343	0.5504	0.5619	Floss total	2	0.5457	0.5429	0.5169	0.514	0.513	0.5125	0.5116	0.5118
Floss Weight	0.0107	0.0105	0.0087	0.0085	0.0087	0.0471	3	0.5343	0.5329	0.5107	0.5075	0.5065	0.5059	0.5049	0.5052
W1 (start-floss)	0.5277	0.5352	0.5256	0.5419	0.5532		4	0.5504	0.5493	0.5207	0.5175	0.5164	0.5161	0.5152	0.5159
Final constant weight	0.5015	0.5118	0.5052	0.5159	0.5269		5	0.5619	0.56	0.5328	0.5293	0.5282	0.5278	0.5268	0.5269
Floss Weight	0.0107	0.0105	0.0087	0.0085	0.0087		Wt-floss	2.6836	2.6742	2.5407	2.5248	2.5194	2.5174	2.5125	2.5142
W2 (final-floss)	0.4908	0.5013	0.4965	0.5074	0.5182		Mean	0.53672	0.53484	0.50814	0.50496	0.50388	0.50348	0.5025	0.50284
							sd	0.0108029	0.0108283	0.010094	0.00995023	0.00995942	0.00994862	0.00998284	0.00991731
% SOLUBILITY	6.99	6.33	5.54	6.37	6.33			Mean solubility		6.31	0.52				

Table 91. Photac-Fil Quick One-Month Solubility Control Sample Results (grams)

PHOTAC ONE MONTH SOLUBILITY (CONTROL GROUP)														
	O'Haus Analytical Plus Scale							pre H2O	post H2O					
2mm Group								3-Jan-06	4-Jan-06	5-Jan-06	6-Jan-06	7-Jan-06	8-Jan-06	9-Jan-06
Sample	1	2	3	4	5		1	0.2276	0.2276	0.2156	0.2153	0.2146	0.2145	
Start weight	0.2276	0.2287	0.2245	0.2103	0.2578	Floss total	2	0.2287	0.2287	0.2174	0.2169	0.2164	0.2162	
Floss Weight	0.0107	0.0117	0.0111	0.0109	0.0121	0.0565	3	0.2245	0.2243	0.2128	0.2123	0.2117	0.2115	
W1 (start-floss)	0.2169	0.217	0.2134	0.1994	0.2457		4	0.2103	0.2093	0.1984	0.1979	0.1975	0.1972	
Final constant weight	0.2145	0.2162	0.2115	0.1972	0.2412		5	0.2578	0.2574	0.2425	0.2418	0.2411	0.2412	
Floss Weight	0.0107	0.0117	0.0111	0.0109	0.0121		Wt-floss	1.0924	1.0908	1.0302	1.0277	1.0248	1.0241	
W2 (final-floss)	0.2038	0.2045	0.2004	0.1863	0.2291		Mean	0.21848	0.21816	0.20604	0.20554	0.20496	0.20482	
							sd	0.0173089	0.017448	0.0159326	0.0158486	0.0157522	0.0158977	
% SOLUBILITY	6.04	5.76	6.09	6.57	6.76			Mean solubility		6.24	0.41			
3mm Group														
Sample	1	2	3	4	5		1	0.3446	0.3443	0.3279	0.3266	0.3255	0.3252	
Start weight	0.3446	0.3621	0.3467	0.3503	0.3595	Floss total	2	0.3621	0.3614	0.3448	0.3435	0.3426	0.3424	
Floss Weight	0.0109	0.0115	0.0101	0.0099	0.0106	0.053	3	0.3467	0.346	0.3305	0.3291	0.3282	0.3282	
W1 (start-floss)	0.3337	0.3506	0.3366	0.3404	0.3489		4	0.3503	0.35	0.3327	0.3316	0.3306	0.3305	
Final constant weight	0.3252	0.3424	0.3282	0.3305	0.3396		5	0.3595	0.3601	0.3423	0.3407	0.3396	0.3396	
Floss Weight	0.0109	0.0115	0.0101	0.0099	0.0106		Wt - floss	1.7102	1.7088	1.6252	1.6185	1.6135	1.6129	
W2 (final-floss)	0.3143	0.3309	0.3181	0.3206	0.329		Mean	0.34204	0.34176	0.32504	0.3237	0.3227	0.32258	
							sd	0.0077774	0.0079469	0.0074705	0.007403	0.0074216	0.007448	
% SOLUBILITY	5.81	5.62	5.50	5.82	5.70			Mean solubility		5.69	0.14			
4mm Group														
Sample	1	2	3	4	5		1	0.467	0.4686	0.4455	0.4431	0.4415	0.4412	0.4412
Start weight	0.467	0.4688	0.4723	0.4549	0.4722	Floss total	2	0.4688	0.4688	0.4466	0.4445	0.443	0.4425	0.4425
Floss Weight	0.0093	0.0096	0.0105	0.0107	0.0111	0.0512	3	0.4723	0.4722	0.4496	0.4472	0.446	0.4459	0.4457
W1 (start-floss)	0.4577	0.4592	0.4618	0.4442	0.4611		4	0.4549	0.4557	0.4337	0.432	0.4305	0.4303	0.4302
Final constant weight	0.4412	0.4425	0.4457	0.4302	0.4472		5	0.4722	0.4727	0.4514	0.4487	0.4475	0.4473	0.4472
Floss Weight	0.0093	0.0096	0.0105	0.0107	0.0111		Wt-floss	2.284	2.2868	2.1756	2.1643	2.1573	2.156	2.1556
W2 (final-floss)	0.4319	0.4329	0.4352	0.4195	0.4361		Mean	0.4568	0.45736	0.43512	0.43286	0.43146	0.4312	0.43112
							sd	0.0071549	0.0069141	0.0069277	0.0065829	0.0066951	0.0066991	0.006686
% SOLUBILITY	5.64	5.73	5.76	5.56	5.42			Mean solubility		5.62	0.14			
5mm Group														
Sample	1	2	3	4	5		1	0.5675	0.5671	0.5436	0.5405	0.5388	0.5382	0.5381
Start weight	0.5675	0.5616	0.5478	0.5466	0.5714	Floss total	2	0.5616	0.5611	0.5362	0.5334	0.5318	0.5315	0.5313
Floss Weight	0.0103	0.0096	0.0087	0.0087	0.0099	0.0472	3	0.5478	0.547	0.5225	0.5199	0.5182	0.5179	0.5175
W1 (start-floss)	0.5572	0.552	0.5391	0.5379	0.5615		4	0.5466	0.5465	0.5216	0.5191	0.5175	0.5169	0.5169
Final constant weight	0.5381	0.5313	0.5175	0.5169	0.541		5	0.5714	0.571	0.5461	0.5436	0.5416	0.5412	0.541
Floss Weight	0.0103	0.0096	0.0087	0.0087	0.0099		Wt-floss	2.7477	2.7455	2.6228	2.6093	2.6007	2.5985	2.5976
W2 (final-floss)	0.5278	0.5217	0.5088	0.5082	0.5311		Mean	0.54954	0.5491	0.52456	0.52186	0.52014	0.5197	0.51952
							sd	0.0113134	0.0113271	0.0115046	0.0113923	0.0112899	0.0112833	0.0112999
% SOLUBILITY	5.28	5.49	5.62	5.52	5.41			Mean solubility		5.46	0.13			

Table 92. Photac-Fil Quick Three-Month Solubility Experimental Sample Results (grams)

PHOTAC THREE MONTH SOLUBILITY (EXPERIMENTAL GROUP)															
		O'Haus Analytical Plus Scale						pre H2O	post H2O						
2mm Group								20-Oct-05	21 Oct o5	22-Oct-05	24-Oct-05	25-Oct-05	26-Oct-05	27-Oct-05
Sample	1	2	3	4	5		1	0.2315	0.2317	0.2191	0.2182	0.2183		
Start weight	0.2315	0.2251	0.223	0.2346	0.2328	Floss total	2	0.2251	0.257	0.2147	0.2139	0.2138		
Floss Weight	0.0078	0.0082	0.0082	0.0093	0.0082	0.0417	3	0.223	0.2236	0.2125	0.2116	0.2115		
W1 (start-floss)	0.2237	0.2169	0.2148	0.2253	0.2246		4	0.2346	0.2349	0.2233	0.2226	0.2225		
Final constant weight	0.2183	0.2138	0.2115	0.2225	0.2208		5	0.2328	0.2335	0.2219	0.2208	0.2208		
Floss Weight	0.0078	0.0082	0.0082	0.0093	0.0082		Wt-floss	1.1053	1.139	1.0498	1.0454	1.0452		
W2 (final-floss)	0.2105	0.2056	0.2033	0.2132	0.2126		Mean	0.22106	0.2278	0.20996	0.20908	0.20904		
							sd	0.00506113	0.012456	0.00461519	0.00461324	0.0046408		
% SOLUBILITY	5.90	5.21	5.35	5.37	5.34			Mean solubility		5.44	0.27			
3mm Group														
Sample	1	2	3	4	5		1	0.353	0.3522	0.3362	0.3347	0.3344		
Start weight	0.353	0.3303	0.3285	0.3323	0.3447	Floss total	2	0.3303	0.3299	0.315	0.3139	0.3138		
Floss Weight	0.0083	0.0079	0.0075	0.0073	0.0081	0.0391	3	0.3285	0.3289	0.3119	0.3107	0.3105		
W1 (start-floss)	0.3447	0.3224	0.321	0.325	0.3366		4	0.3323	0.332	0.3175	0.3164	0.3161		
Final constant weight	0.3344	0.3138	0.3105	0.3161	0.328		5	0.3447	0.3466	0.3295	0.3283	0.328		
Floss Weight	0.0083	0.0079	0.0075	0.0073	0.0081		Wt - floss	1.6497	1.6505	1.571	1.5649	1.5637		
W2 (final-floss)	0.3261	0.3059	0.303	0.3088	0.3199		Mean	0.32994	0.3301	0.3142	0.31298	0.31274		
							sd	0.01062582	0.010724	0.01035794	0.0102279	0.01016971		
% SOLUBILITY	5.40	5.12	5.61	4.98	4.96			Mean solubility		5.21	0.28			
4mm Group														
Sample	1	2	3	4	5		1	0.4536	0.4532	0.4293	0.4277	0.4272	0.427	0.427
Start weight	0.4536	0.4501	0.4402	0.4382	0.4396	Floss total	2	0.4501	0.449	0.4268	0.4252	0.4248	0.4245	0.4245
Floss Weight	0.0075	0.0074	0.0069	0.0074	0.0074	0.0366	3	0.4402	0.4413	0.4212	0.4195	0.4192	0.4188	0.4188
W1 (start-floss)	0.4461	0.4427	0.4333	0.4308	0.4322		4	0.4382	0.438	0.4159	0.4142	0.4136	0.4134	0.4134
Final constant weight	0.427	0.4245	0.4188	0.4134	0.4164		5	0.4396	0.4394	0.4188	0.417	0.4167	0.4163	0.4164
Floss Weight	0.0075	0.0074	0.0069	0.0074	0.0074		Wt-floss	2.1851	2.1843	2.0754	2.067	2.0649	2.0634	2.0635
W2 (final-floss)	0.4195	0.4171	0.4119	0.406	0.409		Mean	0.43702	0.43686	0.41508	0.4134	0.41298	0.41268	0.4127
							sd	0.00700414	0.006594	0.00555923	0.00562646	0.00563294	0.00565553	0.00563933
% SOLUBILITY	5.96	5.78	4.94	5.76	5.37			Mean solubility		5.56	0.41			
5mm Group														
Sample	1	2	3	4	5		1	0.5608	0.5601	0.5339	0.5318	0.5314	0.5311	0.5311
Start weight	0.5608	0.5569	0.5606	0.5547	0.5542	Floss total	2	0.5569	0.5551	0.5299	0.5277	0.5273	0.527	0.527
Floss Weight	0.0069	0.0073	0.0075	0.0077	0.0073	0.0367	3	0.5606	0.562	0.5344	0.5319	0.5315	0.5312	0.531
W1 (start-floss)	0.5539	0.5496	0.5531	0.547	0.5469		4	0.5547	0.5546	0.5268	0.5247	0.5241	0.5238	0.5236
Final constant weight	0.5311	0.527	0.531	0.5236	0.5244		5	0.5542	0.554	0.5277	0.5253	0.5249	0.5246	0.5244
Floss Weight	0.0069	0.0073	0.0075	0.0077	0.0073		Wt-floss	2.7505	2.7491	2.616	2.6047	2.6025	2.601	2.6004
W2 (final-floss)	0.5242	0.5197	0.5235	0.5159	0.5171		Mean	0.5501	0.54982	0.5232	0.52094	0.5205	0.5202	0.52008
							sd	0.00314531	0.003635	0.00348755	0.00344703	0.00349971	0.00349971	0.00354429
% SOLUBILITY	5.36	5.44	5.35	5.69	5.45			Mean solubility		5.46	0.13			

Table 93. Photac-Fil Quick Three Month Solubility Control Sample Results (grams)

PHOTAC THREE MONTH SOLUBILITY (CONTROL GROUP)													
		O'Haus Analytical Plus Scale						pre H2O	post H2O				
2mm Group								2-Nov-05	3-Nov-05	4-Nov-05	7-Nov-05	8-Nov-05	9-Nov-05
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2297	0.229	0.2185	0.2178	0.2178	
Start weight	0.2297	0.2266	0.2326	0.2339	0.2357	Floss total	2	0.2266	0.2274	0.2166	0.2157	0.2157	
Floss Weight	0.009	0.0086	0.0084	0.0077	0.0083	0.042	3	0.2326	0.2333	0.222	0.2212	0.2213	
W1 (start-floss)	0.2207	0.218	0.2242	0.2262	0.2274		4	0.2339	0.2352	0.2221	0.2212	0.2212	
Final constant weight	0.2178	0.2157	0.2213	0.2212	0.2237		5	0.2357	0.2359	0.2245	0.2237	0.2237	
Floss Weight	0.009	0.0086	0.0084	0.0077	0.0083		**Wt-floss**	1.1165	1.1188	1.0617	1.0576	1.0577	
W2 (final-floss)	0.2088	0.2071	0.2129	0.2135	0.2154		**Mean**	0.2233	0.22376	0.21234	0.21152	0.21154	
							sd	0.0035937	0.0037806	0.0031517	0.0031571	0.0031675	
% SOLUBILITY	5.39	5.00	5.04	5.61	5.28			**Mean solubility**		5.26	0.25		
3mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.2642	0.265	0.2525	0.2513	0.2513	
Start weight	0.2642	0.327	0.3318	0.3232	0.3506	Floss total	2	0.327	0.3292	0.3135	0.3116	0.3114	
Floss Weight	0.0093	0.0081	0.0082	0.0077	0.0066	0.0399	3	0.3318	0.3322	0.3159	0.3145	0.3145	
W1 (start-floss)	0.2549	0.3189	0.3236	0.3155	0.344		4	0.3232	0.324	0.3108	0.3094	0.3093	
Final constant weight	0.2513	0.3114	0.3145	0.3093	0.3348		5	0.3506	0.3527	0.3362	0.3349	0.3348	
Floss Weight	0.0093	0.0081	0.0082	0.0077	0.0066		**Wt - floss**	1.5569	1.5632	1.489	1.4818	1.4814	
W2 (final-floss)	0.242	0.3033	0.3063	0.3016	0.3282		**Mean**	0.31138	0.31264	0.2978	0.29636	0.29628	
							sd	0.0325823	0.0329464	0.0314299	0.0313396	0.0312997	
% SOLUBILITY	5.06	4.89	5.35	4.41	4.59			**Mean solubility**		4.86	0.37		
4mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.4623	0.4623	0.4418	0.4396	0.4393	0.439
Start weight	0.4623	0.4256	0.4255	0.435	0.438	Floss total	2	0.4256	0.426	0.4065	0.4048	0.4046	0.4045
Floss Weight	0.0087	0.0076	0.0071	0.0077	0.0075	0.0386	3	0.4255	0.4259	0.4072	0.4051	0.4049	0.4046
W1 (start-floss)	0.4536	0.418	0.4184	0.4273	0.4305		4	0.435	0.4344	0.4141	0.4121	0.4118	0.4116
Final constant weight	0.439	0.4045	0.4046	0.4116	0.4167		5	0.438	0.4389	0.4191	0.4171	0.4169	0.4167
Floss Weight	0.0087	0.0076	0.0071	0.0077	0.0075		**Wt-floss**	2.1478	2.1489	2.0501	2.0401	2.0389	2.0378
W2 (final-floss)	0.4303	0.3969	0.3975	0.4039	0.4092		**Mean**	0.42956	0.42978	0.41002	0.40802	0.40778	0.40756
							sd	0.0150575	0.0149451	0.0144171	0.0142942	0.0142589	0.0142168
% SOLUBILITY	5.14	5.05	5.00	5.48	4.95			**Mean solubility**		5.12	0.21		
5mm Group													
Sample	**1**	**2**	**3**	**4**	**5**		1	0.5636	0.567	0.5413	0.5379	0.5379	0.5376
Start weight	0.5636	0.5327	0.4998	0.5031	0.5183	Floss total	2	0.5327	0.5336	0.5093	0.5066	0.5066	0.5062
Floss Weight	0.0065	0.0077	0.0078	0.0079	0.0078	0.0377	3	0.4998	0.5042	0.4765	0.474	0.4739	0.4736
W1 (start-floss)	0.5571	0.525	0.492	0.4952	0.5105		4	0.5031	0.5025	0.4828	0.4804	0.4803	0.48
Final constant weight	0.5376	0.5062	0.4736	0.48	0.489		5	0.5183	0.516	0.492	0.4892	0.4892	0.489
Floss Weight	0.0065	0.0077	0.0078	0.0079	0.0078		**Wt-floss**	2.5798	2.5856	2.4642	2.4504	2.4502	2.4487
W2 (final-floss)	0.5311	0.4985	0.4658	0.4721	0.4812		**Mean**	0.51596	0.51712	0.49284	0.49008	0.49004	0.48974
							sd	0.0259689	0.0267267	0.0259978	0.0256342	0.0256741	0.0256572
% SOLUBILITY	4.67	5.05	5.33	4.66	5.74			**Mean solubility**		5.09	0.46		

APPENDIX B

HARDNESS TESTING DATA

Table 94. Vitremer 24-Hour Hardness (KHN)

Vitremer 24 Hour Hardness								
2mm								
	1	2	3	4	5			
	29.8	24.8	22.9	24.7	25.0			
top	29.1	24.5	24.3	25.2	25.9	avg	24.5	
	27.2	23.3	25.5	22.4	25.6	st dev	0.4	
avg	28.7	24.2	24.2	24.1	25.5			
st dev	1.3	0.8	1.3	1.5	0.5			% bottom/top
								94.28766
	1	2	3	4	5			
	25.5	21.3	22.1	24.1	23.1			
bottom	24.7	23.0	22.8	23.9	24.9	avg	23.1	
	25.5	20.8	23.5	22.4	25.4	st dev	0.3	
avg	25.2	21.7	22.8	23.5	24.5			
st dev	0.5	1.2	0.7	0.9	1.2			
3mm								
	1	2	3	4	5			
	25.2	26.4	26.4	24.8	24.6			
top	28.0	24.6	24.0	24.6	23.6	avg	24.9	
	26.4	26.0	24.4	26.2	22.9	st dev	0.3	
avg	26.5	25.7	24.9	25.2	23.7			
st dev	1.4	0.9	1.3	0.9	0.9			% bottom/top
								91.12228
	1	2	3	4	5			
	23.7	23.8	22.0	24.3	22.0			
bottom	22.9	21.4	24.0	21.9	20.0	avg	22.7	
	23.6	23.6	23.3	23.0	22.7	st dev	0.4	
avg	23.4	22.9	23.1	23.1	21.6			
st dev	0.4	1.3	1.0	1.2	1.4			
4mm								
	1	2	3	4	5			
	26.9	23.7	25.4	25.8	22.9			
top	25.3	23.0	23.8	23.9	22.2	avg	23.9	
	26.0	24.8	25.5	22.8	22.4	st dev	0.4	
avg	26.1	23.8	24.9	24.2	22.5			
st dev	0.8	0.9	1.0	1.5	0.4			% bottom/top
								85.884
	1	2	3	4	5			
	21.8	24.2	21.6	19.1	17.9			
bottom	20.3	21.8	19.4	22.7	18.2	avg	20.5	
	20.7	20.8	20.3	22.1	17.7	st dev	0.7	
avg	20.9	22.3	20.4	21.3	17.9			
st dev	0.8	1.7	1.1	1.9	0.3			
5mm								
	1	2	3	4	5			
	25.8	22.9	26.2	23.2	23.9			
top	22.8	23.0	26.0	23.4	22.1	avg	24.1	
	25.9	24.1	25.2	24.2	24.7	st dev	0.6	
avg	24.8	23.3	25.8	23.6	23.6			
st dev	1.8	0.7	0.5	0.5	1.3			% bottom/top
								70.88958
	1	2	3	4	5			
	20.7	14.8	20.6	13.6	17.7			
bottom	17.5	13.3	21.4	13.9	19.4	avg	17.1	
	17.6	16.4	19.8	14.0	19.9	st dev	0.6	
avg	18.6	14.8	20.6	13.8	19.0			
st dev	1.8	1.6	0.8	0.2	1.2			

Table 95. Vitremer One-Week Hardness (KHN)

Vitremer 1 Week Hardness								
2mm								
	1	2	3	4	5			
	22.9	22.6	23.0	22.4	23.1			
top	22.7	22.5	21.0	22.7	21.9	avg	22.4	
	22.3	23.3	22.4	22.0	22.4	st dev	0.3	
avg	22.6	22.8	22.1	22.4	22.5			
st dev	0.3	0.4	1.0	0.4	0.6			% bottom/top
								88.8
	1	2	3	4	5			
	20.0	19.4	19.9	19.1	19.4			
bottom	19.9	20.0	20.5	19.8	19.7	avg	19.9	
	20.1	20.7	20.0	20.0	20.7	st dev	0.2	
avg	20.0	20.0	20.1	19.6	19.9			
st dev	0.1	0.7	0.3	0.5	0.7			
3mm								
	1	2	3	4	5			
	22.9	21.4	22.8	21.6	22.4			
top	22.4	22.2	21.6	22.1	23.4	avg	22.4	
	22.7	22.5	23.8	23.1	22.3	st dev	0.3	
avg	22.7	22.0	22.7	22.3	22.7			
st dev	0.3	0.6	1.1	0.8	0.6			% bottom/top
								80.1
	1	2	3	4	5			
	18.7	18.4	18.7	18.6	18.5			
bottom	17.3	16.9	19.1	17.7	17.8	avg	18.0	
	17.6	16.9	17.8	17.9	17.2	st dev	0.1	
avg	17.9	17.4	18.5	18.1	17.8			
st dev	0.7	0.9	0.7	0.5	0.7			
4mm								
	1	2	3	4	5			
	22.0	22.3	22.5	22.0	22.2			
top	22.9	22.2	21.8	22.1	22.7	avg	22.1	
	21.8	21.0	22.1	22.4	21.5	st dev	0.2	
avg	22.2	21.8	22.1	22.2	22.1			
st dev	0.6	0.7	0.4	0.2	0.6			% bottom/top
								78.4
	1	2	3	4	5			
	17.0	17.2	18.3	17.8	18.0			
bottom	16.5	16.9	17.6	16.9	17.3	avg	17.3	
	16.5	16.8	17.0	16.7	17.1	st dev	0.2	
avg	16.7	17.0	17.6	17.1	17.5			
st dev	0.3	0.2	0.7	0.6	0.5			
5mm								
	1	2	3	4	5			
	22.5	22.3	22.7	22.8	23.1			
top	22.9	23.5	23.7	22.2	22.1	avg	22.8	
	22.4	22.1	22.4	23.5	22.6	st dev	0.2	
avg	22.6	22.6	22.9	22.8	22.6			
st dev	0.3	0.8	0.7	0.7	0.5			% bottom/top
								67.6
	1	2	3	4	5			
	15.4	15.0	15.2	15.6	16.0			
bottom	14.3	14.5	14.4	15.8	15.8	avg	15.4	
	16.0	16.1	15.8	15.2	15.1	st dev	0.2	
avg	15.2	15.2	15.1	15.5	15.6			
st dev	0.9	0.8	0.7	0.3	0.5			

Table 96. Vitremer One-Month Hardness (KHN)

Vitremer 1 Month Hardness

2mm

	1	2	3	4	5			
	25.5	28.0	27.3	26.7	27.2			
top	25.8	25.8	26.2	27.1	26.3	avg	27.1	
	25.4	28.3	26.1	28.2	28.2	st dev	0.4	
avg	25.6	27.4	26.5	27.3	27.2			
st dev	0.2	1.4	0.7	0.8	1.0			% bottom/top
								89.92
	1	2	3	4	5			
	23.8	25.3	25.4	24.6	25.5			
bottom	22.1	24.2	23.1	25.3	23.3	avg	24.4	
	22.7	24.4	23.0	25.1	23.4	st dev	0.4	
avg	22.9	24.6	23.8	25.0	24.1			
st dev	0.9	0.6	1.4	0.4	1.2			

3mm

	1	2	3	4	5			
	28.0	27.9	25.1	27.6	27.0			
top	27.1	26.9	27.4	26.1	27.3	avg	26.7	
	26.3	26.6	26.8	27.0	24.7	st dev	0.3	
avg	27.1	27.1	26.4	26.9	26.3			
st dev	0.9	0.7	1.2	0.8	1.4			% bottom/top
								89.45
	1	2	3	4	5			
	24.4	24.3	22.8	23.8	25.9			
bottom	24.3	25.1	23.1	22.6	23.7	avg	23.9	
	24.5	23.5	22.5	25.5	23.8	st dev	0.6	
avg	24.4	24.3	22.8	24.0	24.5			
st dev	0.1	0.8	0.3	1.5	1.2			

4mm

	1	2	3	4	5			
	27.8	27.7	28.4	27.8	26.4			
top	27.1	28.1	28.8	28.2	26.1	avg	27.7	
	28.2	26.8	28.1	27.6	28.5	st dev	0.4	
avg	27.7	27.5	28.4	27.9	27.0			
st dev	0.6	0.7	0.4	0.3	1.3			% bottom/top
								77.26
	1	2	3	4	5			
	21.3	21.2	21.4	22.3	22.8			
bottom	22.3	21.3	22.7	21.1	21.2	avg	21.4	
	20.4	19.5	21.3	21.3	20.8	st dev	0.2	
avg	21.3	20.7	21.8	21.6	21.6			
st dev	1.0	1.0	0.8	0.6	1.1			

5mm

	1	2	3	4	5			
	28.5	28.8	27.6	27.7	27.9			
top	27.8	28.5	26.1	28.1	27.3	avg	27.8	
	27.4	26.2	28.3	28.1	28.8	st dev	0.5	
avg	27.9	27.8	27.3	28.0	28.0			
st dev	0.6	1.4	1.1	0.2	0.8			% bottom/top
								66.50
	1	2	3	4	5			
	17.4	17.9	18.3	19.2	17.5			
bottom	19.2	19.2	18.1	18.6	18.8	avg	18.5	
	18.2	18.9	19.0	18.4	17.8	st dev	0.2	
avg	18.3	18.7	18.5	18.7	18.0			
st dev	0.9	0.7	0.5	0.4	0.7			

Table 97. Vitremer Three-Month Hardness (KHN)

Vitremer 3 Month Hardness								
2mm								
	1	2	3	4	5			
	27.5	26.9	29.5	25.6	27.4			
top	28.0	26.8	28.7	26.9	26.0	avg	27.1	
	25.6	27.1	27.0	27.2	25.7	st dev	0.5	
avg	27.0	26.9	28.4	26.6	26.4			
st dev	1.3	0.2	1.3	0.9	0.9			% bottom/top
								91.81034
	1	2	3	4	5			
	28.0	24.0	24.6	25.4	26.9			
bottom	25.9	26.8	22.6	25.4	23.3	avg	24.9	
	26.6	25.3	23.0	25.2	25.7	st dev	0.6	
avg	26.8	25.4	23.4	25.3	25.3			
st dev	1.1	1.4	1.1	0.1	1.8			
3mm								
	1	2	3	4	5			
	26.8	22.4	22.4	24.7	23.4			
top	26.9	25.0	22.8	22.8	23.3	avg	23.3	
	28.5	26.2	21.3	23.4	21.7	st dev	0.5	
avg	27.4	24.5	22.2	23.6	22.8			
st dev	1.0	1.9	0.8	1.0	1.0			% bottom/top
								85.89835
	1	2	3	4	5			
	22.7	18.5	19.2	19.3	19.1			
bottom	24.5	21.0	20.2	20.3	19.7	avg	20.0	
	25.0	21.4	21.6	20.5	19.2	st dev	0.5	
avg	24.1	20.3	20.3	20.0	19.3			
st dev	1.2	1.6	1.2	0.6	0.3			
4mm								
	1	2	3	4	5			
	23.6	15.9	25.1	20.3	26.1			
top	22.6	16.1	24.3	20.7	25.7	avg	21.7	
	22.3	17.8	23.3	21.6	23.1	st dev	0.4	
avg	22.8	16.6	24.2	20.9	25.0			
st dev	0.7	1.0	0.9	0.7	1.6			% bottom/top
								76.57692
	1	2	3	4	5			
	20.9	13.5	18.6	17.6	16.0			
bottom	19.9	14.0	17.5	17.3	16.4	avg	16.6	
	20.7	15.3	18.1	18.0	16.8	st dev	0.2	
avg	20.5	14.3	18.1	17.6	16.4			
st dev	0.5	0.9	0.6	0.4	0.4			
5mm								
	1	2	3	4	5			
	26.0	25.0	25.2	22.8	24.0			
top	24.7	24.9	25.0	24.1	23.1	avg	24.5	
	25.4	25.1	27.1	24.0	23.3	st dev	0.4	
avg	25.4	25.0	25.8	23.6	23.5			
st dev	0.7	0.1	1.2	0.7	0.5			% bottom/top
								68.46049
	1	2	3	4	5			
	14.9	18.4	16.0	18.1	16.2			
bottom	14.4	15.2	16.9	18.1	15.8	avg	16.8	
	16.6	17.3	15.7	16.6	16.7	st dev	0.5	
avg	15.3	17.0	16.2	17.6	16.2			
st dev	1.2	1.6	0.6	0.9	0.5			

Table 98. Fuji II LC 24-Hour Hardness (KHN)

FUJI II LC 24 HOUR HARDNESS

2mm								
	1	2	3	4	5			
	21.3	20.4	21.0	20.1	21.0			
top	22.2	21.4	20.5	21.8	21.3	avg	20.8	
	20.3	21.0	19.7	21.1	20.7	st dev	0.3	
avg	21.3	20.9	20.4	21.0	21.0			
st dev	1.0	0.5	0.7	0.9	0.3			% bottom/top
								88.2
	1	2	3	4	5			
	19.0	18.0	17.9	17.7	18.6			
bottom	17.9	18.7	18.9	17.3	18.5	avg	18.4	
	19.8	19.2	18.4	18.6	18.8	st dev	0.3	
avg	18.9	18.6	18.4	17.9	18.6			
st dev	1.0	0.6	0.5	0.7	0.2			
3mm								
	1	2	3	4	5			
	19.5	19.9	20.8	19.5	19.6			
top	19.8	20.0	21.2	21.1	21.3	avg	20.4	
	20.1	20.5	19.9	20.3	20.5	st dev	0.3	
avg	19.8	20.1	20.6	20.3	20.5			
st dev	0.3	0.3	0.7	0.8	0.9			% bottom/top
								74.7
	1	2	3	4	5			
	14.9	14.6	14.8	15.8	14.6			
bottom	14.4	15.5	15.4	15.2	15.9	avg	15.2	
	15.1	15.3	15.6	15.7	14.3	st dev	0.2	
avg	14.8	15.1	15.3	15.6	14.9			
st dev	0.4	0.5	0.4	0.3	0.9			
4mm								
	1	2	3	4	5			
	19.8	19.6	20.0	19.4	21.1			
top	20.1	20.5	19.3	20.5	21.2	avg	20.2	
	21.2	20.8	19.8	19.7	20.2	st dev	0.1	
avg	20.4	20.3	19.7	19.9	20.8			
st dev	0.7	0.6	0.4	0.6	0.6			% bottom/top
								57.7
	1	2	3	4	5			
	9.5	13.6	9.9	11.9	12.5			
bottom	9.4	12.4	11.8	11.4	10.3	avg	11.6	
	10.6	13.5	11.3	10.8	10.2	st dev	0.3	
avg	9.8	13.2	11.0	11.4	11.0			
st dev	0.7	0.7	1.0	0.6	1.3			
5mm								
	1	2	3	4	5			
	20.7	20.2	20.3	21.7	20.7			
top	21.8	19.6	20.6	20.0	20.5	avg	20.2	
	21.0	19.8	19.8	19.7	19.9	st dev	0.3	
avg	21.2	19.9	20.2	20.5	20.4			
st dev	0.6	0.3	0.4	1.1	0.4			% bottom/top
								47.8
	1	2	3	4	5			
	10.9	8.7	10.2	9.2	9.7			
bottom	9.3	10.8	10.0	9.6	9.6	avg	9.7	
	9.7	10.1	9.1	9.2	9.9	st dev	0.4	
avg	10.0	9.9	9.7	9.3	9.7			
st dev	0.8	1.0	0.6	0.2	0.2			

Table 99. Fuji II LC One-Week Hardness (KHN)

FUJI II LC 1 Week Hardness								
2mm								
	1	2	3	4	5			
	20.9	21.5	21.6	20.7	20.0			
top	19.3	22.0	19.8	22.0	19.5	avg	20.7	
	20.7	22.2	19.3	20.3	19.1	st dev	0.3	
avg	20.3	21.9	20.2	21.0	19.5			
st dev	0.9	0.4	1.2	0.9	0.5			% bottom/top
								90.77
	1	2	3	4	5			
	20.8	20.7	19.1	17.0	21.7			
bottom	20.7	19.3	18.9	16.4	18.3	avg	18.8	
	19.2	19.2	19.8	15.7	19.0	st dev	0.5	
avg	20.2	19.7	19.3	16.4	19.7			
st dev	0.9	0.8	0.5	0.7	1.8			
3mm								
	1	2	3	4	5			
	20.5	20.1	19.9	21.3	20.6			
top	21.9	20.2	20.6	21.2	21.1	avg	20.6	
	22.0	20.1	20.9	20.2	20.7	st dev	0.3	
avg	21.5	20.1	20.5	20.9	20.8			
st dev	0.8	0.1	0.5	0.6	0.3			% bottom/top
								88.50
	1	2	3	4	5			
	18.0	17.6	17.9	19.4	18.0			
bottom	19.8	18.0	17.7	19.6	17.1	avg	18.2	
	19.3	18.6	18.1	18.3	18.2	st dev	0.3	
avg	19.0	18.1	17.9	19.1	17.8			
st dev	0.9	0.5	0.2	0.7	0.6			
4mm								
	1	2	3	4	5			
	19.8	20.1	20.0	20.9	22.6			
top	21.0	21.2	21.6	21.0	22.5	avg	21.3	
	21.9	21.0	21.4	20.7	22.0	st dev	0.4	
avg	20.9	20.8	21.0	20.9	22.4			
st dev	1.1	0.6	0.9	0.2	0.3			% bottom/top
								72.59
	1	2	3	4	5			
	14.1	13.8	14.5	15.7	15.8			
bottom	14.4	16.1	15.9	15.6	13.9	avg	15.4	
	15.5	16.6	15.0	14.8	17.4	st dev	0.6	
avg	14.7	15.5	15.1	15.4	15.7			
st dev	0.7	1.5	0.7	0.5	1.8			
5mm								
	1	2	3	4	5			
	20.9	22.1	21.6	20.3	22.2			
top	21.4	22.2	21.4	20.0	21.8	avg	21.3	
	20.6	22.6	20.3	19.5	21.8	st dev	0.2	
avg	21.0	22.3	21.1	19.9	21.9			
st dev	0.4	0.3	0.7	0.4	0.2			% bottom/top
								60.24
	1	2	3	4	5			
	12.5	11.9	13.7	13.0	13.1			
bottom	12.2	12.4	13.2	11.9	13.4	avg	12.8	
	12.4	12.0	11.4	13.9	14.2	st dev	0.5	
avg	12.4	12.1	12.8	12.9	13.6			
st dev	0.2	0.3	1.2	1.0	0.6			

Table 100. Fuji II LC One-Month Hardness (KHN)

FUJI II LC 1 Month Hardness

2mm

	1	2	3	4	5			
	18.7	18.9	19.0	18.8	21.2			
top	19.3	21.3	18.8	20.3	21.1	avg	20.0	
	19.0	20.7	19.3	21.2	19.9	st dev	0.5	
avg	19.0	20.3	19.0	20.1	20.7			
st dev	0.3	1.2	0.3	1.2	0.7			% bottom/top
								90.94
	1	2	3	4	5			
	17.2	17.3	19.0	18.2	18.5			
bottom	17.5	17.5	17.9	18.3	18.8	avg	18.2	
	17.5	18.5	17.3	18.7	18.7	st dev	0.3	
avg	17.4	17.8	18.1	18.4	18.7			
st dev	0.2	0.6	0.9	0.3	0.2			

3mm

	1	2	3	4	5			
	20.3	19.2	21.8	22.4	20.4			
top	20.6	19.4	20.5	19.3	19.8	avg	20.1	
	21.0	18.5	19.2	20.9	20.3	st dev	0.6	
avg	20.6	19.0	20.5	20.9	20.2			
st dev	0.4	0.5	1.3	1.6	0.3			% bottom/top
								82.91
	1	2	3	4	5			
	17.0	17.1	16.0	17.8	15.8			
bottom	16.3	16.5	15.7	17.9	16.5	avg	16.7	
	17.5	16.7	16.2	17.3	16.9	st dev	0.2	
avg	16.9	16.8	16.0	17.7	16.4			
st dev	0.6	0.3	0.3	0.3	0.6			

4mm

	1	2	3	4	5			
	20.5	20.8	18.8	20.1	19.2			
top	20.9	19.8	18.6	20.9	19.0	avg	19.6	
	18.3	18.7	18.0	19.9	21.2	st dev	0.4	
avg	19.9	19.8	18.5	20.3	19.8			
st dev	1.4	1.1	0.4	0.5	1.2			% bottom/top
								60.49
	1	2	3	4	5			
	14.4	12.2	12.3	11.2	11.1			
bottom	12.5	12.3	11.8	12.7	11.0	avg	11.8	
	15.1	13.2	11.9	9.9	12.5	st dev	0.5	
avg	14.0	12.6	12.0	11.3	11.5			
st dev	1.3	0.6	0.3	1.4	0.8			

5mm

	1	2	3	4	5			
	20.8	20.2	20.0	19.9	20.2			
top	19.2	18.0	20.3	20.9	20.5	avg	20.1	
	20.5	20.0	19.9	21.8	19.9	st dev	0.4	
avg	20.2	19.4	20.1	20.9	20.2			
st dev	0.9	1.2	0.2	1.0	0.3			% bottom/top
								54.23
	1	2	3	4	5			
	9.1	10.0	11.9	9.4	11.5			
bottom	9.7	11.0	9.9	9.7	11.6	avg	10.9	
	9.8	11.4	12.1	10.0	12.6	st dev	0.4	
avg	9.5	10.8	11.3	9.7	11.9			
st dev	0.4	0.7	1.2	0.3	0.6			

Table 101. Fuji II LC Three-Month Hardness (KHN)

FUJI II LC 3 Month Hardness								
2mm								
	1	2	3	4	5			
	20.3	20.7	22.3	21.7	20.9			
top	20.4	19.6	20.7	18.0	18.3	avg	20.6	
	21.1	20.1	21.5	23.7	20.2	st dev	1.0	
avg	20.6	20.1	21.5	21.1	19.8			
st dev	0.4	0.6	0.8	2.9	1.3			% bottom/top
								90.23
	1	2	3	4	5			
	19.8	18.9	18.4	18.3	18.1			
bottom	19.7	17.1	18.4	19.8	18.9	avg	18.6	
	19.5	19.9	17.5	20.5	17.7	st dev	0.5	
avg	19.7	18.6	18.1	19.5	18.2			
st dev	0.2	1.4	0.5	1.1	0.6			
3mm								
	1	2	3	4	5			
	20.3	21.3	21.4	20.5	20.5			
top	21.4	20.5	21.0	20.2	20.2	avg	20.6	
	21.3	20.1	22.2	19.7	19.7	st dev	0.1	
avg	21.0	20.6	21.5	20.1	20.1			
st dev	0.6	0.6	0.6	0.4	0.4			% bottom/top
								94.18
	1	2	3	4	5			
	19.7	19.3	19.6	19.1	19.1			
bottom	19.3	19.6	19.5	19.3	19.3	avg	19.4	
	19.6	19.2	20.1	19.4	19.4	st dev	0.1	
avg	19.5	19.4	19.7	19.3	19.3			
st dev	0.2	0.2	0.3	0.2	0.2			
4mm								
	1	2	3	4	5			
	20.3	20.6	22.8	20.0	20.2			
top	21.9	21.8	20.5	20.5	21.4	avg	21.3	
	22.2	22.0	23.3	21.9	20.9	st dev	0.3	
avg	21.5	21.5	22.2	20.8	20.8			
st dev	1.0	0.8	1.5	1.0	0.6			% bottom/top
								61.43
	1	2	3	4	5			
	13.3	15.9	14.4	13.4	12.2			
bottom	13.8	13.8	15.4	11.1	11.8	avg	13.1	
	15.2	13.0	15.5	10.1	10.6	st dev	0.5	
avg	14.1	14.2	15.1	11.5	11.5			
st dev	1.0	1.5	0.6	1.7	0.8			
5mm								
	1	2	3	4	5			
	22.0	20.8	20.4	20.0	22.4			
top	21.6	20.7	21.0	20.4	21.8	avg	21.0	
	21.0	22.1	20.2	20.4	21.2	st dev	0.2	
avg	21.5	21.2	20.5	20.3	21.8			
st dev	0.5	0.8	0.4	0.2	0.6			% bottom/top
								50.62
	1	2	3	4	5			
	11.9	11.3	10.9	9.8	9.1			
bottom	10.3	9.4	11.0	12.8	10.5	avg	10.6	
	12.8	10.4	10.0	11.3	10.8	st dev	0.4	
avg	11.7	10.4	10.6	11.3	10.1			
st dev	1.3	0.9	0.6	1.5	0.9			

Table 102. Photac-Fil Quick 24-Hour Hardness (KHN)

Photac-Fil Quick 24 Hour Hardness

2mm								
	1	2	3	4	5			
	11.8	11.3	12.8	11.0	11.9			
top	11.6	10.1	12.3	12.7	11.6	avg	11.5	
	12.2	11.0	11.0	10.6	11.5	st dev	0.4	
avg	11.9	10.8	12.0	11.4	11.7			
st dev	0.3	0.6	0.9	1.1	0.2			% bottom/top
								81.7
	1	2	3	4	5			
	9.8	9.0	10.3	8.7	7.8			
bottom	10.8	8.9	11.2	10.3	9.3	avg	9.4	
	10.4	9.5	10.1	9.1	8.5	st dev	0.2	
avg	10.3	9.1	10.5	9.4	8.5			
st dev	0.5	0.3	0.6	0.8	0.7			
3mm								
	1	2	3	4	5			
	11.6	13.1	12.6	11.9	10.4			
top	13.3	12.4	11.7	10.9	10.1	avg	11.6	
	12.2	10.9	12.7	12.5	10.2	st dev	0.4	
avg	12.4	12.1	12.3	11.8	10.2			
st dev	0.9	1.1	0.6	0.8	0.2			% bottom/top
								79.0
	1	2	3	4	5			
	9.7	9.2	8.7	9.0	8.0			
bottom	10.0	8.5	9.9	8.3	9.4	avg	9.2	
	8.7	9.8	10.0	9.6	9.8	st dev	0.1	
avg	9.5	9.2	9.6	8.9	9.1			
st dev	0.7	0.7	0.7	0.7	0.9			
4mm								
	1	2	3	4	5			
	13.4	12.7	11.6	11.1	11.8			
top	12.4	12.9	10.7	12.7	12.8	avg	12.0	
	12.4	13.5	10.6	11.1	12.1	st dev	0.2	
avg	12.7	13.0	11.0	11.6	12.2			
st dev	0.6	0.4	0.6	0.9	0.5			% bottom/top
								70.0
	1	2	3	4	5			
	7.6	8.2	7.4	8.1	8.9			
bottom	10.1	9.3	8.1	8.0	8.4	avg	8.4	
	10.4	8.6	7.7	8.6	9.3	st dev	0.5	
avg	9.4	8.7	7.7	8.2	8.9			
st dev	1.5	0.6	0.4	0.3	0.4			
5mm								
	1	2	3	4	5			
	11.7	12.5	12.6	10.7	12.0			
top	11.4	11.2	12.7	10.7	12.4	avg	11.6	
	13.2	11.4	11.9	9.2	11.6	st dev	0.3	
avg	12.1	11.7	12.4	10.2	12.0			
st dev	1.0	0.7	0.4	0.9	0.4			% bottom/top
								75.5
	1	2	3	4	5			
	9.5	8.8	8.2	7.8	7.6			
bottom	8.0	10.4	9.1	9.6	7.7	avg	8.7	
	8.9	10.4	8.2	9.6	7.4	st dev	0.4	
avg	8.8	9.9	8.5	9.0	7.6			
st dev	0.8	0.9	0.5	1.1	0.2			

Table 103. Photac-Fil Quick One-Week Hardness (KHN)

Photac-Fil Quick 1 Week Hardness

2mm

	1	2	3	4	5			
	14.1	14.2	14.6	13.2	13.9			
top	13.8	12.5	14.4	13.5	14.2	avg	13.7	
	13.3	12.9	13.4	13.8	14.1	st dev	0.3	
avg	13.7	13.2	14.1	13.5	14.1			
st dev	0.4	0.9	0.6	0.3	0.2			% bottom/top
								87.3
	1	2	3	4	5			
	12.5	12.7	12.1	11.4	11.8			
bottom	12.2	13.1	11.9	11.6	11.5	avg	12.0	
	12.3	11.9	12.0	11.9	11.9	st dev	0.2	
avg	12.3	12.6	12.0	11.6	11.7			
st dev	0.2	0.6	0.1	0.3	0.2			

3mm

	1	2	3	4	5			
	13.9	13.7	14.2	14.5	13.4			
top	13.3	12.6	14.1	13.4	13.3	avg	13.6	
	12.6	12.6	13.6	13.3	13.9	st dev	0.2	
avg	13.3	13.0	14.0	13.7	13.5			
st dev	0.7	0.6	0.3	0.7	0.3			% bottom/top
								83.3
	1	2	3	4	5			
	11.0	11.8	11.3	10.6	10.6			
bottom	10.4	11.9	11.9	11.0	11.2	avg	11.3	
	12.1	11.9	11.0	11.3	11.0	st dev	0.3	
avg	11.2	11.9	11.4	11.0	10.9			
st dev	0.9	0.1	0.5	0.4	0.3			

4mm

	1	2	3	4	5			
	14.5	12.4	12.5	13.6	13.3			
top	13.9	12.8	11.7	13.3	13.1	avg	12.8	
	12.8	12.9	12.3	12.5	12.8	st dev	0.3	
avg	13.7	12.7	12.2	13.1	13.1			
st dev	0.9	0.3	0.4	0.6	0.3			% bottom/top
								82.3
	1	2	3	4	5			
	10.6	9.6	10.5	10.6	11.2			
bottom	10.9	10.9	10.4	10.9	11.0	avg	10.5	
	10.3	10.2	10.2	10.5	10.1	st dev	0.2	
avg	10.6	10.2	10.4	10.7	10.8			
st dev	0.3	0.7	0.2	0.2	0.6			

5mm

	1	2	3	4	5			
	12.9	13.0	13.0	12.3	12.5			
top	12.7	13.2	12.4	12.0	13.8	avg	12.7	
	13.4	12.9	12.1	12.5	12.8	st dev	0.2	
avg	13.0	13.0	12.5	12.3	13.0			
st dev	0.4	0.2	0.5	0.3	0.7			% bottom/top
								80.4
	1	2	3	4	5			
	8.4	10.2	10.5	10.8	9.8			
bottom	9.4	10.8	9.4	10.1	10.6	avg	10.2	
	8.5	10.3	10.0	9.9	10.3	st dev	0.1	
avg	8.7	10.4	10.0	10.3	10.2			
st dev	0.5	0.3	0.6	0.5	0.4			

Table 104. Photac-Fil Quick One-Month Hardness (KHN)

Photac-Fil Quick 1 Month Hardness								
2mm								
	1	2	3	4	5			
	20.1	17.1	18.2	19.2	17.8			
top	17.0	17.4	18.0	17.7	16.4	avg	17.5	
	17.0	16.4	17.2	17.5	17.6	st dev	0.5	
avg	18.0	17.0	17.8	18.1	17.3			
st dev	1.8	0.5	0.5	0.9	0.8			% bottom/top
								92.9
	1	2	3	4	5			
	16.1	17.2	16.9	16.3	16.2			
bottom	16.1	16.5	16.4	15.8	15.6	avg	16.3	
	15.6	16.5	16.5	15.9	15.8	st dev	0.1	
avg	15.9	16.7	16.6	16.0	15.9			
st dev	0.3	0.4	0.3	0.3	0.3			
3mm								
	1	2	3	4	5			
	17.7	19.4	18.7	19.8	17.6			
top	16.7	17.3	19.0	17.2	17.3	avg	18.1	
	16.9	17.6	18.5	17.5	17.4	st dev	0.6	
avg	17.1	18.1	18.7	18.2	17.4			
st dev	0.5	1.1	0.3	1.4	0.2			% bottom/top
								86.1
	1	2	3	4	5			
	15.4	16.7	15.8	15.7	15.9			
bottom	15.1	15.8	15.0	14.9	15.2	avg	15.6	
	15.2	16.8	14.9	14.8	15.6	st dev	0.2	
avg	15.2	16.4	15.2	15.1	15.6			
st dev	0.2	0.6	0.5	0.5	0.4			
4mm								
	1	2	3	4	5			
	18.7	19.1	18.6	18.9	19.0			
top	18.0	17.9	18.8	18.8	17.2	avg	18.2	
	17.6	18.3	17.1	17.5	17.5	st dev	0.2	
avg	18.1	18.4	18.2	18.4	17.9			
st dev	0.6	0.6	0.9	0.8	1.0			% bottom/top
								79.7
	1	2	3	4	5			
	15.3	15.5	14.9	12.2	14.5			
bottom	15.2	15.1	15.1	13.8	15.2	avg	14.5	
	15.0	14.9	15.0	14.0	14.2	st dev	0.4	
avg	15.2	15.2	15.0	13.3	14.6			
st dev	0.2	0.3	0.1	1.0	0.5			
5mm								
	1	2	3	4	5			
	17.4	16.7	17.6	19.8	17.8			
top	14.8	17.1	17.3	19.7	17.2	avg	17.9	
	17.6	18.2	17.4	18.8	17.3	st dev	0.6	
avg	16.6	17.3	17.4	19.4	17.4			
st dev	1.6	0.8	0.2	0.6	0.3			% bottom/top
								62.4
	1	2	3	4	5			
	10.9	9.7	10.4	13.5	10.4			
bottom	9.0	10.3	10.9	13.7	10.8	avg	11.2	
	9.7	10.4	11.3	12.7	10.0	st dev	0.2	
avg	9.9	10.1	10.9	13.3	10.4			
st dev	1.0	0.4	0.5	0.5	0.4			

Table 105. Photac-Fil Quick Three-Month Hardness (KHN)

Photac-Fil Quick 3 Month Hardness								
2mm								
	1	2	3	4	5			
	18.4	17.9	17.5	16.8	19.2			
top	15.3	16.5	16.5	17.2	16.9	avg	17.0	
	16.9	15.4	16.3	17.8	16.5	st dev	0.5	
avg	16.9	16.6	16.8	17.3	17.5			
st dev	1.6	1.3	0.6	0.5	1.5			% bottom/top
								90.56
	1	2	3	4	5			
	16.4	16.2	16.2	15.6	15.8			
bottom	15.9	14.9	16.1	15.2	15.2	avg	15.4	
	16.0	15.0	14.2	15.0	15.8	st dev	0.4	
avg	16.1	15.4	15.5	15.3	15.6			
st dev	0.3	0.7	1.1	0.3	0.3			
3mm								
	1	2	3	4	5			
	16.8	17.4	16.4	16.9	17.6			
top	17.0	16.0	17.0	16.6	16.9	avg	16.8	
	16.2	16.4	16.1	17.0	17.0	st dev	0.2	
avg	16.7	16.6	16.5	16.8	17.2			
st dev	0.4	0.7	0.5	0.2	0.4			% bottom/top
								80.73
	1	2	3	4	5			
	13.4	14.2	13.3	11.2	13.9			
bottom	13.1	13.6	13.8	13.1	13.3	avg	13.5	
	14.3	13.4	14.0	14.5	14.2	st dev	0.5	
avg	13.6	13.7	13.7	12.9	13.8			
st dev	0.6	0.4	0.4	1.7	0.5			
4mm								
	1	2	3	4	5			
	17.2	16.9	16.0	17.0	17.6			
top	16.8	16.1	17.0	17.2	17.0	avg	16.9	
	16.4	16.6	16.8	16.9	17.4	st dev	0.1	
avg	16.8	16.5	16.6	17.0	17.3			
st dev	0.4	0.4	0.5	0.2	0.3			% bottom/top
								66.37
	1	2	3	4	5			
	10.6	11.8	11.5	10.9	10.7			
bottom	10.8	11.8	11.4	11.5	10.1	avg	11.2	
	9.9	11.6	10.7	11.4	11.0	st dev	0.1	
avg	10.4	11.7	11.2	11.3	10.6			
st dev	0.5	0.1	0.4	0.3	0.5			
5mm								
	1	2	3	4	5			
	17.7	16.3	17.1	17.8	18.0			
top	17.8	16.7	17.7	18.0	16.2	avg	17.3	
	17.7	18.0	17.5	17.7	16.8	st dev	0.4	
avg	17.7	17.0	17.4	17.8	17.0			
st dev	0.1	0.9	0.3	0.2	0.9			% bottom/top
								61.85
	1	2	3	4	5			
	11.2	11.3	10.9	9.9	12.2			
bottom	12.6	11.4	9.4	9.2	11.9	avg	10.7	
	11.0	10.9	10.1	10.2	11.2	st dev	0.2	
avg	11.6	11.2	10.1	9.7	11.8			
st dev	0.9	0.3	0.7	0.5	0.5			

APPENDIX C

SPECIFIC HEAT
THERMAL ANALYSIS DATA

Table 106. Vitremer Specific Heat Results (J/gC°)

Vitremer	Specific Heat Capacity		
MMEDIATE			
Sample	**2mm**	**3mm**	**4mm**
1	1.2	1.09	0.97
2	1.31	1.08	0.95
3	1.19	1.09	0.94
4	1.2	1.03	0.91
5	1.17	1.02	1.01
Mean	**1.21**	**1.06**	**0.96**
SD	**0.06**	**0.03**	**0.04**
24 Hours			
Sample	**2mm**	**3mm**	**4mm**
1	1.26	0.99	1
2	1.32	1.01	0.96
3	1.26	1.12	0.77
4	1.1	1.07	0.95
5	1.17	1.05	0.93
Mean	**1.22**	**1.05**	**0.92**
SD	**0.09**	**0.05**	**0.09**
1 WEEK			
Sample	**2mm**	**3mm**	**4mm**
1	1.32	1.15	1.02
2	1.27	1.04	0.99
3	1.28	1.1	0.95
4	1.28	1.07	0.94
5	1.27	1.12	1
Mean	**1.28**	**1.10**	**0.98**
SD	**0.02**	**0.04**	**0.03**
1 MONTH			
Sample	**2mm**	**3mm**	**4mm**
1	1.25	1.11	1.09
2	1.24	1.09	1
3	1.24	1.15	1.07
4	1.29	1.12	0.99
5	1.26	1.14	
Mean	**1.26**	**1.12**	**1.04**
SD	**0.02**	**0.02**	**0.05**
3 MONTHS			
Sample	**2mm**	**3mm**	**4mm**
1	1.31	1.37	1.18
2	1.44	1.18	1.1
3	1.33	1.19	1.16
4	1.44	1.09	1.19
5	1.26	1.32	1.1
Mean	**1.36**	**1.23**	**1.15**
SD	**0.08**	**0.11**	**0.04**

Table 107. Fuji II LC Specific Heat Results (J/gC°)

FUJI II LC Specific Heat (J/gC°)			
IMMEDIATE			
Sample	**2mm**	**3mm**	**4mm**
1	1.03	0.94	0.84
2	1.02	0.96	0.78
3	1.02	0.94	0.83
4	1.06	0.89	0.86
5	1.05	0.92	0.82
Mean	**1.04**	**0.93**	**0.83**
SD	**0.02**	**0.03**	**0.03**
24 Hours			
Sample	**2mm**	**3mm**	**4mm**
1.00	1.21	0.98	0.89
2.00	1.20	0.95	0.93
3.00	1.19	1.00	0.92
4.00	1.23	0.97	0.92
5.00	1.21	0.97	0.91
Mean	**1.21**	**0.97**	**0.91**
SD	**0.01**	**0.02**	**0.02**
1 WEEK			
Sample	**2mm**	**3mm**	**4mm**
1.00	1.16	1.05	0.99
2.00	1.14	1.10	1.09
3.00	1.19	1.12	1.01
4.00	1.19	1.07	0.99
5.00	1.17	0.99	1.00
Mean	**1.17**	**1.07**	**1.02**
SD	**0.02**	**0.05**	**0.04**
1 MONTH			
Sample	**2mm**	**3mm**	**4mm**
1.00	1.24	0.98	0.92
2.00	1.13	0.98	0.99
3.00	1.22	0.95	0.97
4.00	1.03	0.92	0.97
5.00	1.18	1.00	0.95
Mean	**1.16**	**0.97**	**0.96**
SD	**0.08**	**0.03**	**0.03**
3 MONTHS			
Sample	**2mm**	**3mm**	**4mm**
1.00	1.16	0.96	0.98
2.00	0.77	1.02	1.00
3.00	1.01	1.01	0.87
4.00	1.16	0.96	0.99
5.00	1.14	0.99	0.99
Mean	**1.05**	**0.99**	**0.97**
SD	**0.17**	**0.03**	**0.05**

Table 108. Photac-Fil Quick Specific Heat Results (J/gC°)

Photac-Fil Quick Specific Heat (J/gC°)			
IMMEDIATE			
Sample	**2mm**	**3mm**	**4mm**
1	1.07	0.86	0.82
2	1.05	0.92	0.82
3	1.05	0.97	0.83
4	1.13	0.98	0.87
5	1.08	0.90	0.81
Mean	**1.08**	**0.93**	**0.83**
SD	**0.03**	**0.05**	**0.02**
24 Hour			
Sample	**2mm**	**3mm**	**4mm**
1	1.22	1.06	0.84
2	1.13	1.16	0.89
3	1.21	1.10	0.94
4	1.15	1.11	0.96
5	1.22	1.12	0.81
Mean	**1.19**	**1.11**	**0.89**
SD	**0.04**	**0.04**	**0.06**
1 WEEK			
Sample	**2mm**	**3mm**	**4mm**
1	1.05	0.98	0.93
2	1.11	0.94	0.90
3	0.84	0.92	0.99
4	1.13	0.92	0.96
5	1.13	0.90	0.96
Mean	**1.05**	**0.93**	**0.95**
SD	**0.12**	**0.03**	**0.03**
1 MONTH			
Sample	**2mm**	**3mm**	**4mm**
1	1.02	1.03	1.00
2	0.91	1.00	0.92
3	1.15	1.04	0.85
4	1.16	0.97	0.89
5	1.15	0.94	0.93
Mean	**1.08**	**1.00**	**0.92**
SD	**0.11**	**0.04**	**0.06**
3 MONTHS			
Sample	**2mm**	**3mm**	**4mm**
1	1.09	1.04	0.91
2	1.16	1.01	0.96
3	1.15	1.02	0.99
4	1.17	1.03	0.99
5	1.22	1.02	0.99
Mean	**1.16**	**1.02**	**0.97**
SD	**0.05**	**0.01**	**0.03**

APPENDIX D

DIFFERENTIAL SCANNING CALORIMETRY
THERMAL SCAN
THERMAL ANALYSIS DATA

Table 109. Vitremer DSC Thermal Scan Results (J/gm)

Vitremer	DSC SCAN THERMAL RESULTS (J/gm)					
IMMEDIATE						
Sample	**2mm**	**Peak °C**	**3mm**	**Peak °C**	**4mm**	**Peak °C**
1	-2.39	185.01	-50.82	158.18	-34.84	161.99
2	-4.14	174.58	-41.8	155.03	-41.85	154.25
3	-2.28	183.5	-43.72	156.53	-46.22	152.61
4	-3.22	186.56	-36.15	160.96	-56.11	150.67
5	-2.84	185.06	-31.43	158.44	-57.27	134.07
Mean	**-2.97**	**182.94**	**-40.78**	**157.83**	**-47.26**	**150.72**
SD	**0.75**	**4.80**	**6.62**	**1.99**	**8.52**	**9.17**
24 hours						
Sample	**2mm**	**Peak °C**	**3mm**	**Peak °C**	**4mm**	**Peak °C**
1	-37.07	109.86	-46.69	131.93	-55.45	136.78
2	-32.23	111.53	-40.52	126.43	-50.05	136.31
3	-29.1	107.43	-51.13	122.41	-65.67	130.87
4	-16	103.84	-51.89	125.85	-51.9	132.45
5	-22.54	107.43	-49.53	147.43	-51.86	131.2
Mean	**-27.39**	**108.02**	**-47.95**	**130.81**	**-54.99**	**133.52**
SD	**8.27**	**2.91**	**4.12**	**8.85**	**5.62**	**2.53**
I WEEK						
Sample	**2mm**	**Peak °C**	**3mm**	**Peak °C**	**4mm**	**Peak °C**
1	-31.76	109.77	-61.78	140.55	-60.78	129.16
2	-45.33	115.54	-75.02	134.27	-81.63	133.28
3	-46.23	110.6	-66.01	141.35	-71.64	134.45
4	-45.97	106.48	-62.7	130.2	-57.48	133.62
5	-47.36	111.02	-55.38	126.41	-66.93	138.04
Mean	**-43.33**	**110.68**	**-64.18**	**134.56**	**-67.69**	**133.71**
SD	**6.51**	**3.25**	**6.42**	**5.79**	**8.51**	**2.84**
1 MONTH						
Sample	**2mm**	**Peak °C**	**3mm**	**Peak °C**	**4mm**	**Peak °C**
1	-51.94	117.9	-71.24	131.01	-114.45	132.95
2	-45.7	116.06	-83.89	133.48	-129.96	131.92
3	-54.02	114.22	-93.49	132	-92.74	132.16
4	-44.59	110.75	-101.74	132.7	-94.83	131
5	-52.34	114.24	-93.08	131.04	-85.27	129.4
Mean	**-49.72**	**114.63**	**-88.69**	**132.05**	**-103.45**	**131.49**
SD	**4.26**	**2.65**	**10.39**	**0.96**	**16.39**	**1.21**
3 MONTHS						
Sample	**2mm**	**Peak °C**	**3mm**	**Peak °C**	**4mm**	**Peak °C**
1	-102.52	122.7	-136.94	126.66	-130.69	126.83
2	-68.54	119.11	-112.35	131.37	-122.02	128.91
3	-98.17	126.63	-104.86	131.02	-143.73	126.06
4	-96.78	119.91	-79.61	129.56	-57.48	133.62
5	-84.15	119.34	-84.03	130.29	-66.93	138.04
Mean	**-90.03**	**121.54**	**-103.56**	**129.78**	**-104.17**	**130.69**
SD	**13.82**	**3.19**	**20.73**	**1.68**	**35.08**	**4.52**

Table 110. Fuji II LC DSC Thermal Scan Results (J/gm)

FUJI II LC DSC SCAN THERMAL RESULTS						
IMMEDIATE						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-24.21	183.01	-33.75	174.06	-32.96	164.06
2	-25.49	183.77	-37.29	175.15	-38.49	161.60
3	-24.06	180.83	-33.73	172.40	-31.34	163.00
4	-2.25	82.65	-26.34	180.42	-35.74	164.23
5	-0.85	81.89	-36.56	171.47	-33.86	165.17
Mean	-15.37	142.43	-33.53	174.70	-34.48	163.61
SD	12.64	54.93	3.88	3.13	2.46	1.22
24 hours						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-37.01	119.84	-23.58	128.37	-37.73	137.25
2	-38.71	117.39	-36.44	146.94	-40.58	143.85
3	-28.96	106.32	-40.21	151.56	-40.27	138.89
4	-41.75	142.42	-34.22	157.47	-32.74	143.35
5	-37.93	146.69	-38.80	149.04	-42.75	142.61
Mean	-36.87	126.53	-34.65	146.68	-38.81	141.19
SD	4.77	17.29	5.90	9.81	3.43	2.63
I WEEK						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-49.64	145.63	-81.90	145.78	-74.48	135.89
2	-51.97	115.01	-78.47	148.74	-74.86	136.86
3	-57.90	122.44	-78.15	147.26	-69.43	138.49
4	-52.77	131.67	-80.85	148.70	-72.22	139.33
5	-49.79	115.99	-80.76	145.95	-73.50	139.19
Mean	-52.41	126.15	-80.03	147.29	-72.90	137.95
SD	3.35	12.76	1.46	1.28	1.96	1.35
1 MONTH						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-30.90	128.24	-82.05	142.53	-70.14	136.68
2	-57.91	126.47	-74.32	144.23	-82.08	131.80
3	-41.79	117.13	-67.23	138.71	-84.02	142.05
4	-46.71	136.68	-77.15	144.90	-78.53	131.02
5	-53.28	134.36	-82.14	144.09	-76.62	136.58
Mean	-46.12	128.58	-76.58	142.89	-78.28	135.63
SD	10.50	7.66	5.54	2.23	4.83	3.98
3 MONTHS						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-54.69	136.13	-73.36	141.26	-86.27	141.12
2	-38.18	136.78	-72.26	140.06	-80.76	141.23
3	-42.03	143.60	-73.70	141.82	-73.57	136.44
4	-53.41	130.42	-79.98	142.50	-77.92	132.18
5	-49.97	117.44	-75.38	142.90	-89.20	143.32
Mean	-47.66	132.87	-74.94	141.71	-81.54	138.86
SD	7.24	9.81	2.71	1.00	5.63	4.03

Table 111. Photac-Fil Quick Thermal Scan Results (J/gm)

PHOTAC-FIL QUIK DSC THERMAL SCAN RESULTS (J/gm)						
IMMEDIATE						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-4.61	134.36	-29.49	193.12	-42.99	174.07
2	-3.44	115.69	-33.12	197.81	-42.66	176.14
3	-5.39	109.72	-30.45	196.44	-42.26	173.59
4	-3.97	59.76	-31.86	197.58	-48.59	173.60
5	-21.41	196.81	-45.49	186.72	-41.20	175.55
Mean	**-7.76**	**123.27**	**-34.08**	**194.33**	**-43.54**	**174.59**
SD	**7.66**	**49.51**	**5.84**	**4.16**	**2.60**	**1.06**
24 hours						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-35.75	144.05	-65.98	158.38	-46.43	160.57
2	-32.19	162.00	-72.35	144.94	-53.12	153.53
3	-36.49	147.91	-69.73	152.55	-66.80	150.44
4	-37.70	111.14	-75.59	142.74	-69.45	153.07
5	-32.73	108.36	-70.84	148.22	-55.55	153.92
Mean	**-34.97**	**134.69**	**-70.90**	**149.37**	**-58.27**	**154.31**
SD	**2.40**	**23.75**	**3.15**	**5.59**	**8.62**	**3.36**
I WEEK						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-34.64	139.38	-72.18	145.72	-79.04	144.54
2	-36.54	134.54	-58.99	148.69	-72.21	143.77
3	-39.82	145.91	-69.66	145.94	-73.56	139.91
4	-64.64	143.77	-67.79	143.59	-67.58	144.99
5	-58.33	142.52	-69.98	142.74	-62.55	143.25
Mean	**-46.79**	**141.22**	**-67.72**	**145.34**	**-70.99**	**143.29**
SD	**13.72**	**4.42**	**4.58**	**2.08**	**5.58**	**1.79**
1 MONTH						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-48.94	139.90	-75.85	140.55	-81.85	141.00
2	-41.36	132.92	-75.82	139.66	-81.60	142.65
3	-41.01	138.24	-74.89	139.66	-74.78	140.31
4	-53.79	138.00	-70.63	140.19	-74.29	140.05
5	-53.55	134.39	-72.97	140.62	-73.29	141.08
Mean	**-47.73**	**136.69**	**-74.03**	**140.14**	**-77.16**	**141.02**
SD	**6.28**	**2.91**	**2.00**	**0.42**	**3.76**	**0.91**
3 MONTHS						
Sample	2mm	Peak °C	3mm	Peak °C	4mm	Peak °C
1	-62.47	125.41	-89.83	137.58	-99.04	139.36
2	-47.00	128.96	-90.57	136.56	-96.78	139.50
3	-57.73	133.54	-94.67	137.76	-104.29	134.31
4	-66.28	133.65	-95.60	138.07	-100.01	136.68
5	-61.94	125.79	-90.60	137.56	-99.63	137.32
Mean	**-59.08**	**129.47**	**-92.25**	**137.51**	**-99.95**	**137.43**
SD	**7.40**	**4.01**	**2.39**	**0.51**	**2.44**	**1.91**

APPENDIX E

THERMAL WEIGHT CHANGE DATA

Table 112. Vitremer Immediate Thermal Weight Data

Vitremer Immediate Thermal Weight Change Weights in mg

2mm 40 µl pan

		pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss
1		31.71	95.59	95.59	95.05	94.67	94.42	91.4	
	weight - pan		63.88	63.88	63.34	62.96	62.71	59.69	
	diff from original weight			0	-0.54	-0.92	-1.17	-4.19	
	diff from previous weight			0	-0.54	-0.38	-0.25	-3.02	
	est H2O loss		%H2O loss				-1.17	1.83	
	% mat loss during scan							4.73	6.56
2		31.56	95.45	95.45	94.64	94.2	93.91	90.39	
	weight - pan		63.89	63.89	63.08	62.64	62.35	58.83	
	diff from original weight			0	-0.81	-1.25	-1.54	-5.06	
	diff from previous weight			0	-0.81	-0.44	-0.29	-3.52	
	Est h2O loss		%H2O loss				-1.54	2.41	
	% mat loss during scan							5.51	7.92
3		31.7	109.6	109.6	109.03	108.67	108.4	104.97	
	weight - pan		77.9	77.9	77.33	76.97	76.7	73.27	
	diff from original weight			0	-0.57	-0.93	-1.2	-4.63	
	diff from previous weight			0	-0.57	-0.36	-0.27	-3.43	
	Est h2O loss		%H2O loss				-1.2	1.54	
	% mat loss during scan							4.40	5.94
4		30.86	101.7	101.7	101.12	100.7	100.43	97.2	
	weight - pan		70.84	70.84	70.26	69.84	69.57	66.34	
	diff from original weight			0	-0.58	-1	-1.27	-4.5	
	diff from previous weight			0	-0.58	-0.42	-0.27	-3.23	
	Est h2O loss		%H2O loss				-1.27	1.79	
	% mat loss during scan							4.56	6.35
5		31.51	116.49	116.49	116.08	115.69	115.45	111.8	
	weight - pan		84.98	84.98	84.57	84.18	83.94	80.29	
	diff from original weight			0	-0.41	-0.8	-1.04	-4.69	
	diff from previous weight			0	-0.41	-0.39	-0.24	-3.65	
	Est h2O loss		%H2O loss				-1.04	1.22	
	% mat loss during scan							4.30	5.52

	(mg)	stand dev
Mean start weight	72.30	9.16
Mean H20 gain	0.00	0.00
Mean H2O loss	-1.08	0.19
Mean change HC1	-0.58	0.14
Mean change HC2	-0.40	0.03
Mean change HC3	-0.26	0.02
Mean change scan	-3.37	0.25
Mean % loss scan	4.70	0.48
Mean % total loss	6.46	0.91

3 mm 100 µl pan reference wt 63.76 weight 7 Nov 63.74

ref pan weight

		pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1		61.56	221.97	221.97	221.17	220.74	220.33	209.06	
	weight - pan		160.41	160.41	159.61	159.18	158.77	147.5	
	diff from original weight			0	-0.8	-1.23	-1.64	-12.91	
	diff from previous weight			0	-0.8	-0.43	-0.41	-11.27	
	est H2O loss		%H2O loss				-1.64	1.02	
	% mat loss during scan							7.03	8.05
2		61.39	221.9	221.9	221.08	220.55	220.14	208.89	
	weight - pan		160.51	160.51	159.69	159.16	158.75	147.5	
	diff from original weight			0	-0.82	-1.35	-1.76	-13.01	
	diff from previous weight			0	-0.82	-0.53	-0.41	-11.25	
	Est h2O loss		%H2O loss				-1.76	1.10	
	% mat loss during scan							7.01	8.11
3		61.38	199.2	199.2	198.5	198.08	197.63	188.81	
	weight - pan		137.82	137.82	137.12	136.7	136.25	127.43	
	diff from original weight			0	-0.7	-1.12	-1.57	-10.39	
	diff from previous weight			0	-0.7	-0.42	-0.45	-8.82	
	Est h2O loss		%H2O loss				-1.57	1.14	
	% mat loss during scan							6.40	7.54
4		62.05	209.5	209.5	209.19	208.57	208.29	200.28	
	weight - pan		147.45	147.45	147.14	146.52	146.24	138.23	
	diff from original weight			0	-0.31	-0.93	-1.21	-9.22	
	diff from previous weight			0	-0.31	-0.62	-0.28	-8.01	
	Est h2O loss		%H2O loss				-1.21	0.82	
	% mat loss during scan							5.43	6.25
5		61.72	225.86	225.86	225.23	224.8	224.68	215.73	
	weight - pan		164.14	164.14	163.51	163.08	162.96	154.01	
	diff from original weight			0	-0.63	-1.06	-1.18	-10.13	
	diff from previous weight			0	-0.63	-0.43	-0.12	-8.95	
	Est h2O loss		%H2O loss				-1.18	0.72	
	% mat loss during scan							5.45	6.17

	(mg)	stand dev
Mean start weight	154.07	11.08
Mean H20 gain	0.00	0.00
Mean H2O loss	-1.26	0.26
Mean change HC1	-0.65	0.21
Mean change HC2	-0.49	0.09
Mean change HC3	-0.33	0.14
Mean change scan	-9.66	1.50
Mean % loss scan	6.26	0.79
Mean % total loss	7.22	0.95

4 mm

		pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1		61.23	288.33	288.33	287.5	286.99	286.31	272.03	
	weight - pan		227.1	227.1	226.27	225.76	225.08	210.8	
	diff from original weight			0	-0.83	-1.34	-2.02	-16.3	
	diff from previous weight			0	-0.83	-0.51	-0.68	-14.28	
	est H2O loss		%H2O loss				-2.02	0.89	
	% mat loss during scan							6.29	7.18
2		61.71	296.14	296.14	295.52	295.11	294.78	281.11	
	weight - pan		234.43	234.43	233.81	233.4	233.07	219.4	
	diff from original weight			0	-0.62	-1.03	-1.36	-15.03	
	diff from previous weight			0	-0.62	-0.41	-0.33	-13.67	
	Est h2O loss		%H2O loss				-1.36	0.58	
	% mat loss during scan							5.83	6.41
3		61.35	298.48	298.48	297.7	297.18	296.78	281.97	
	weight - pan		237.13	237.13	236.35	235.83	235.43	220.62	
	diff from original weight			0	-0.78	-1.3	-1.7	-16.51	
	diff from previous weight			0	-0.78	-0.52	-0.4	-14.81	
	Est h2O loss		%H2O loss				-1.7	0.72	
	% mat loss during scan							6.25	6.96
4		61.76	317.52	317.52	316.83	316.39	316.02	298.7	
	weight - pan		255.76	255.76	255.07	254.63	254.26	236.94	
	diff from original weight			0	-0.69	-1.13	-1.5	-18.82	
	diff from previous weight			0	-0.69	-0.44	-0.37	-17.32	
	Est h2O loss		%H2O loss				-1.5	0.59	
	% mat loss during scan							6.77	7.36
5		61.3	306.41	306.41	305.73	305.3	304.97	288.23	
	weight - pan		245.11	245.11	244.43	244	243.67	226.93	
	diff from original weight			0	-0.68	-1.11	-1.44	-18.18	
	diff from previous weight			0	-0.68	-0.43	-0.33	-16.74	
	Est h2O loss		%H2O loss				-1.44	0.59	
	% mat loss during scan							6.83	7.42

	(mg)	stand dev
Mean start weight	239.91	10.96
Mean H20 gain	0.00	0.00
Mean H2O loss	-1.38	0.26
Mean change HC1	-0.72	0.08
Mean change HC2	-0.46	0.05
Mean change HC3	-0.42	0.15
Mean change scan	-15.36	1.59
Mean % loss scan	6.39	0.41
Mean % total loss	7.07	0.41

Table 113. Vitremer 24-Hour Thermal Weight Data

Vitremer 24-Hour Thermal Weight Change				Weights in mg								
2mm	40 µl pan											
	pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/gain%	Scan/gain%	Scan/RetH20%
1	31.72	105.76		106.67	105.49	104.96	104.56	100.56				
weight - pan		74.04		74.95	73.77	73.24	72.84	68.84				
diff from original weight				0.91	-0.27	-0.8	-1.2	-5.20				
diff from previous weight				0.91	-1.18	-0.53	-0.4	-4.00				
est H2O loss		%H2O loss					-2.11	2.62				
% mat loss during scan								5.34	8.15	671.43	439.56	-333.33
2	31.35	103.34		104.39	103.01	102.39	101.98	97.90				
weight - pan		71.99		73.04	71.66	71.04	70.63	66.55				
diff from original weight				1.05	-0.33	-0.95	-1.36	-5.44				
diff from previous weight				1.05	-1.38	-0.62	-0.41	-4.08				
Est h2O loss		%H2O loss					-2.41	3.30				
% mat loss during scan								5.59	8.89	618.10	388.57	-300.00
3	31.16	106.38		107.16	105.88	105.25	104.93	101.06				
weight - pan		75.22		76	74.72	74.09	73.77	69.90				
diff from original weight				0.78	-0.5	-1.13	-1.45	-5.32				
diff from previous weight				0.78	-1.28	-0.63	-0.32	-3.87				
Est h2O loss		%H2O loss					-2.23	2.93				
% mat loss during scan								5.09	8.03	782.05	496.15	-266.90
4	31.29	110.46		111.31	110.34	109.76	109.37	105.76				
weight - pan		79.17		80.02	79.05	78.47	78.08	74.47				
diff from original weight				0.85	-0.12	-0.7	-1.09	-4.70				
diff from previous weight				0.85	-0.97	-0.58	-0.39	-3.61				
Est h2O loss		%H2O loss					-1.94	2.42				
% mat loss during scan								4.51	6.94	652.94	424.71	-331.19
5	31.47	107.65		108.66	107.56	107.22	106.8	103.46				
weight - pan		76.18		77.19	76.09	75.75	75.33	71.99				
diff from original weight				1.01	-0.09	-0.43	-0.85	-4.19				
diff from previous weight				1.01	-1.1	-0.34	-0.42	-3.34				
Est h2O loss		%H2O loss					-1.86	2.41				
% mat loss during scan								4.33	6.74	514.85	330.69	-392.94
3 mm	100 µl pan reference wt		63.76									
	ref pan weight		63.74									
	pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.55	215.54		216.7	215.47	214.8	214.22	204.75				
weight - pan		153.99		155.15	153.92	153.25	152.67	143.2				
diff from original weight				1.16	-0.07	-0.74	-1.32	-10.79				
diff from previous weight				1.16	-1.23	-0.67	-0.58	-9.47				
est H2O loss		%H2O loss					-2.48	1.60				
% mat loss during scan								6.10	7.70	1030.17	816.38	-717.42
2	61.14	228.66		229.81	228.82	228.3	227.89	218.68				
weight - pan		167.52		168.67	167.68	167.16	166.75	157.54				
diff from original weight				1.15	0.16	-0.36	-0.77	-9.98				
diff from previous weight				1.15	-0.99	-0.52	-0.41	-9.21				
Est h2O loss		%H2O loss					-1.92	1.14				
% mat loss during scan								5.46	6.60	967.83	800.87	-1196.10
3	61.54	213.32		214.48	213.32	212.73	211.94	201.8				
weight - pan		151.78		152.94	151.78	151.19	150.4	140.26				
diff from original weight				1.16	0	-0.59	-1.38	-11.52				
diff from previous weight				1.16	-1.16	-0.59	-0.79	-10.14				
Est h2O loss		%H2O loss					-2.54	1.66				
% mat loss during scan								6.63	8.29	1093.10	874.14	-734.78
4	61.47	224.31		225.73	224.72	224.11	223.63	212.99				
weight - pan		162.84		164.26	163.25	162.64	162.16	151.52				
diff from original weight				1.42	0.41	-0.2	-0.68	-11.32				
diff from previous weight				1.42	-1.01	-0.61	-0.48	-10.64				
Est h2O loss		%H2O loss					-2.1	1.28				
% mat loss during scan								6.48	7.76	897.18	749.30	-1564.71
5	61.44	221.84		223.28	222.33	221.82	221.38	211.47				
weight - pan		160.4		161.84	160.89	160.38	159.94	150.03				
diff from original weight				1.44	0.49	-0.02	-0.46	-10.37				
diff from previous weight				1.44	-0.95	-0.51	-0.44	-9.91				
Est h2O loss		%H2O loss					-1.9	1.17				
% mat loss during scan								6.12	7.30	820.14	688.19	-2154.35
4 mm												
	pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.56	310.07		311.68	310.78	310.13	309.62	292.82				
weight - pan		248.51		250.12	249.22	248.57	248.06	231.26				
diff from original weight				1.61	0.71	0.06	-0.45	-17.25				
diff from previous weight				1.61	-0.9	-0.65	-0.51	-16.8				
est H2O loss		%H2O loss					-2.06	0.82				
% mat loss during scan								6.72	7.54	1171.43	1043.48	-3733.33
2	61.21	314.71		316.92	315.82	315.23	314.72	298.28				
weight - pan		253.5		255.71	254.61	254.02	253.51	237.07				
diff from original weight				2.21	1.11	0.52	0.01	-16.43				
diff from previous weight				2.21	-1.1	-0.59	-0.51	-16.44				
Est h2O loss		%H2O loss					-2.2	0.86				
% mat loss during scan								6.43	7.29	843.44	743.89	164400.00
3	62.03	307.54		309.21	308.22	307.67	307.2	289.72				
weight - pan		245.51		247.18	246.19	245.64	245.17	227.69				
diff from original weight				1.67	0.68	0.13	-0.34	-17.82				
diff from previous weight				1.67	-0.99	-0.55	-0.47	-17.48				
Est h2O loss		%H2O loss					-2.01	0.81				
% mat loss during scan								7.07	7.88	1167.07	1046.71	-5141.18
4	61.57	338.92		341.01	339.78	339.13	338.4	321.96				
weight - pan		277.35		279.44	278.21	277.56	276.83	260.39				
diff from original weight				2.09	0.86	0.21	-0.52	-16.96				
diff from previous weight				2.09	-1.23	-0.65	-0.73	-16.44				
Est h2O loss		%H2O loss					-2.61	0.93				
% mat loss during scan								5.88	6.82	911.48	786.60	-3161.54
5	61.76	335.77		338.05	336.62	336.07	335.61	319.28				
weight - pan		274.01		276.29	274.86	274.31	273.85	257.52				
diff from original weight				2.28	0.85	0.3	-0.16	-16.49				
diff from previous weight				2.28	-1.43	-0.55	-0.46	-16.33				
Est h2O loss		%H2O loss					-2.44	0.88				
% mat loss during scan								5.91	6.79	823.25	716.23	-10206.25

Table 114. Vitremer One-Week Thermal Weight Data

Vitremer One Week Thermal Weight Change					Weights in mg								
2mm	40 µl pan	ref pan weight		32.99									
		ref pan weight		33.09	29-Nov-05								
		pan empty	filled + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
	1	32.83	106.27		107.85	107.51	106.56	106.12	101.21				
weight - pan			73.44		75.02	74.68	73.73	73.29	68.38				
diff from original weight					1.58	1.24	0.29	-0.15	-5.06				
diff from previous weight					1.58	-0.34	-0.95	-0.44	-4.91				
est H2O loss			%H2O loss					-1.73	2.31				
% mat loss during scan									6.54	8.85	420.25	310.76	-3273.33
	2	32.92	116.45		118.36	117.38	116.85	116.35	110.67				
weight - pan			83.53		85.44	84.46	83.93	83.43	77.75				
diff from original weight					1.91	0.93	0.4	-0.1	-5.78				
diff from previous weight					1.91	-0.98	-0.53	-0.5	-5.68				
Est h2O loss			%H2O loss					-2.01	2.35				
% mat loss during scan									6.65	9.00	402.62	297.38	-5680.00
	3	32.44	110.06		111.85	110.86	110.37	109.88	104.96				
weight - pan			77.62		79.41	78.42	77.93	77.44	72.52				
diff from original weight					1.79	0.8	0.31	-0.18	-5.1				
diff from previous weight					1.79	-0.99	-0.49	-0.49	-4.92				
Est h2O loss			%H2O loss					-1.97	2.48				
% mat loss during scan									6.20	8.68	384.92	274.86	-2733.33
	4	32.71	99.12		100.73	99.57	99.24	99.11	95.09				
weight - pan			66.41		68.02	66.86	66.53	66.4	62.38				
diff from original weight					1.61	0.45	0.12	-0.01	-4.03				
diff from previous weight					1.61	-1.16	-0.33	-0.13	-4.02				
Est h2O loss			%H2O loss					-1.62	2.38				
% mat loss during scan									5.91	8.29	350.31	249.69	-40200.00
	5	32.68	110.21		112.31	111.04	110.3	110.04	105.89				
weight - pan			77.53		79.63	78.36	77.62	77.36	73.21				
diff from original weight					2.1	0.83	0.09	-0.17	-4.32				
diff from previous weight					2.1	-1.27	-0.74	-0.26	-4.15				
Est h2O loss			%H2O loss					-2.27	2.85				
% mat loss during scan									5.21	8.06	305.71	197.62	-2441.18
3 mm	100 µl pan reference wt			63.88									
		ref pan weight		63.89		29-Nov-05							
		pan empty	filled + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
	1	63.53	198.8		202.56	200.91	199.95	199.16	189.13				
weight - pan			135.27		139.03	137.38	136.42	135.63	125.6				
diff from original weight					3.76	2.11	1.15	0.36	-9.67				
diff from previous weight					3.76	-1.65	-0.96	-0.79	-10.03				
est H2O loss			%H2O loss					-3.4	2.45				
% mat loss during scan									7.21	9.66	357.18	266.76	2786.11
	2	61.17	220.32		224.38	222.6	221.67	221.24	209.19				
weight - pan			159.15		163.21	161.43	160.5	160.07	148.02				
diff from original weight					4.06	2.28	1.35	0.92	-11.13				
diff from previous weight					4.06	-1.78	-0.93	-0.43	-12.05				
Est h2O loss			%H2O loss					-3.14	1.92				
% mat loss during scan									7.38	9.31	374.14	296.80	1309.78
	3	61.9	225.2		229.57	227.83	227.04	226.18	213.79				
weight - pan			163.3		167.67	165.93	165.14	164.28	151.89				
diff from original weight					4.37	2.63	1.84	0.98	-11.41				
diff from previous weight					4.37	-1.74	-0.79	-0.86	-12.39				
Est h2O loss			%H2O loss					-3.39	2.02				
% mat loss during scan									7.39	9.41	361.10	283.52	1264.29
	4	61.55	229.2		233.2	231.81	230.98	230.18	218.21				
weight - pan			167.65		171.65	170.26	169.43	168.63	156.66				
diff from original weight					4	2.61	1.78	0.98	-10.99				
diff from previous weight					4	-1.39	-0.83	-0.8	-11.97				
Est h2O loss			%H2O loss					-3.02	1.76				
% mat loss during scan									6.97	8.73	374.75	299.25	1221.43
	5	61.38	213.55		217.2	215.85	214.78	214.09	203.83				
weight - pan			152.17		155.82	154.47	153.4	152.71	142.45				
diff from original weight					3.65	2.3	1.23	0.54	-9.72				
diff from previous weight					3.65	-1.35	-1.07	-0.69	-10.26				
Est h2O loss			%H2O loss					-3.11	2.00				
% mat loss during scan									6.58	8.58	366.30	281.10	1900.00
4 mm													
		pan empty	filled + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
	1	61.08	313.08		315.37	314.23	313.6	313.03	295.15				
weight - pan			252		254.29	253.15	252.52	251.95	234.07				
diff from original weight					2.29	1.15	0.52	-0.05	-17.93				
diff from previous weight					2.29	-1.14	-0.63	-0.57	-17.88				
est H2O loss			%H2O loss					-2.34	0.92				
% mat loss during scan									7.03	7.95	882.97	780.79	-35760.00
	2	61.34	292.25		294.69	293.12	292.44	291.94	272.8				
weight - pan			230.91		233.35	231.78	231.1	230.6	211.46				
diff from original weight					2.44	0.87	0.19	-0.31	-19.45				
diff from previous weight					2.44	-1.57	-0.68	-0.5	-19.14				
Est h2O loss			%H2O loss					-2.75	1.18				
% mat loss during scan									8.20	9.38	897.13	784.43	-6174.19
	3	61.67	290.07		292.32	291.33	290.77	290.26	273.34				
weight - pan			228.4		230.65	229.66	229.1	228.59	211.67				
diff from original weight					2.25	1.26	0.7	0.19	-16.73				
diff from previous weight					2.25	-0.99	-0.56	-0.51	-16.92				
Est h2O loss			%H2O loss					-2.06	0.89				
% mat loss during scan									7.34	8.23	843.56	752.00	8905.26
	4	61.69	316.89		319.54	318.55	317.87	317.43	300.36				
weight - pan			255.2		257.85	256.86	256.18	255.74	238.67				
diff from original weight					2.65	1.66	0.98	0.54	-16.53				
diff from previous weight					2.65	-0.99	-0.68	-0.44	-17.07				
Est h2O loss			%H2O loss					-2.11	0.82				
% mat loss during scan									6.62	7.44	723.77	644.15	3161.11
	5	61.57	291.23		293.72	292.62	291.98	291.45	275.22				
weight - pan			229.66		232.15	231.05	230.41	229.88	213.65				
diff from original weight					2.49	1.39	0.75	0.22	-16.01				
diff from previous weight					2.49	-1.1	-0.64	-0.53	-16.23				
Est h2O loss			%H2O loss					-2.27	0.98				
% mat loss during scan									6.99	7.97	742.97	651.81	7377.27

Table 115. Vitremer One Month Thermal Weight Data

Vitremer 1 Month Thermal Weight Data Weights in mg

2mm 40 µl pan ref pan weight 32.98
ref pan weight 33.03 21-Nov-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Total/Scan%	Scan/RetH2O%
1	32.58	109.54	110.52	109.78	109.4	109.11	104.73				
weight - pan		76.96	77.94	77.2	76.82	76.53	72.15				
diff from original weight			0.98	0.24	-0.14	-0.43	-4.81				
diff from previous weight			0.98	-0.74	-0.38	-0.29	-4.38				
est H2O loss		%H2O loss				-1.41	1.81				
% mat loss during scan							5.62	7.43	590.82	446.94	-1018.60
2	32.63	107.79	113.84	113.11	112.68	112.44	107.48				
weight - pan		75.16	81.21	80.48	80.05	79.81	74.85				
diff from original weight			6.05	5.32	4.89	4.65	-0.31				
diff from previous weight			6.05	-0.73	-0.43	-0.24	-4.96				
Est h2O loss		%H2O loss				-1.4	1.72				
% mat loss during scan							6.11	7.83	105.12	81.98	106.67
3	33.02	111.3	112.31	111.6	111.1	110.95	106.18				
weight - pan		78.28	79.29	78.58	78.08	77.93	73.16				
diff from original weight			1.01	0.3	-0.2	-0.35	-5.12				
diff from previous weight			1.01	-0.71	-0.5	-0.15	-4.77				
Est h2O loss		%H2O loss				-1.36	1.72				
% mat loss during scan							6.02	7.73	606.93	472.28	-1362.86
4	32.8	100.38	101.2	100.38	99.98	99.77	95.54				
weight - pan		67.58	68.4	67.58	67.18	66.97	62.74				
diff from original weight			0.82	0	-0.4	-0.61	-4.84				
diff from previous weight			0.82	-0.82	-0.4	-0.21	-4.23				
Est h2O loss		%H2O loss				-1.43	2.09				
% mat loss during scan							6.18	8.27	690.24	515.85	-693.44
5	32.9	97.15	97.85	97.16	97.16	96.54	92.29				
weight - pan		64.25	64.95	64.26	64.26	63.64	59.39				
diff from original weight			0.7	0.01	0.01	-0.61	-4.86				
diff from previous weight			0.7	-0.69	0	-0.62	-4.25				
Est h2O loss		%H2O loss				-1.31	2.02				
% mat loss during scan							6.54	8.56	794.29	607.14	-696.72

3 mm 100 µl pan reference wt 63.67
ref pan weight 63.73 07-Dec-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Total/Scan%	Scan/RetH2O%
1	63.79	205.2	209.29	207.5	206.28	205.69	195.36				
weight - pan		141.41	145.5	143.71	142.49	141.9	131.57				
diff from original weight			4.09	2.3	1.08	0.49	-9.84				
diff from previous weight			4.09	-1.79	-1.22	-0.59	-10.33				
est H2O loss		%H2O loss				-3.6	2.47				
% mat loss during scan							7.10	9.57	340.59	252.57	2108.16
2	63.61	199.35	202.77	201.7	201.13	200.66	189.94				
weight - pan		135.74	139.16	138.09	137.52	137.05	126.33				
diff from original weight			3.42	2.35	1.78	1.31	-9.41				
diff from previous weight			3.42	-1.07	-0.57	-0.47	-10.72				
Est h2O loss		%H2O loss				-2.11	1.52				
% mat loss during scan							7.70	9.22	375.15	313.45	818.32
3	64.04	210.5	214.49	213.27	212.71	212.04	199.19				
weight - pan		146.46	150.45	149.23	148.67	148	135.15				
diff from original weight			3.99	2.77	2.21	1.54	-11.31				
diff from previous weight			3.99	-1.22	-0.56	-0.67	-12.85				
Est h2O loss		%H2O loss				-2.45	1.63				
% mat loss during scan							8.54	10.17	383.46	322.06	834.42
4	63.75	218.63	222.94	221.9	221.04	220.5	206.8				
weight - pan		154.88	159.19	158.15	157.29	156.75	143.05				
diff from original weight			4.31	3.27	2.41	1.87	-11.83				
diff from previous weight			4.31	-1.04	-0.86	-0.54	-13.7				
Est h2O loss		%H2O loss				-2.44	1.53				
% mat loss during scan							8.61	10.14	374.48	317.87	732.62
5	63.76	206.35	210.67	209.5	208.76	207.95	195.58				
weight - pan		142.59	146.91	145.74	145	144.19	131.82				
diff from original weight			4.32	3.15	2.41	1.6	-10.77				
diff from previous weight			4.32	-1.17	-0.74	-0.81	-12.37				
Est h2O loss		%H2O loss				-2.72	1.85				
% mat loss during scan							8.42	10.27	349.31	286.34	773.13

4 mm

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Total/Scan%	Scan/RetH2O%
1	64.09	280.74	292.7	287.37	286.33	285.6	263.16				
weight - pan		216.65	228.61	223.28	222.24	221.51	199.07				
diff from original weight			11.96	6.63	5.59	4.86	-17.58				
diff from previous weight			11.96	-5.33	-1.04	-0.73	-22.44				
est H2O loss		%H2O loss				-7.1	3.11				
% mat loss during scan							9.82	12.92	246.99	187.63	461.73
2	63.9	293.53	299.2								
weight - pan		229.63	235.3	-63.9	-63.9	-63.9	-63.9				
diff from original weight			5.67	-293.53	-293.53	-293.53	-293.53				
diff from previous weight			5.67	-299.2	0	0	0				
Est h2O loss		%H2O loss				-299.2	xxxx				
% mat loss during scan							#DIV/0!				
3	63.04	290.6	295.46	294.4	293.62	293.06	275.01				
weight - pan		227.56	232.42	231.36	230.58	230.02	211.97				
diff from original weight			4.86	3.8	3.02	2.46	-15.59				
diff from previous weight			4.86	-1.06	-0.78	-0.56	-18.05				
Est h2O loss		%H2O loss				-2.4	1.03				
% mat loss during scan							7.77	8.80	420.78	371.40	733.74
4	64.05	294.97	302.92	298.97	298.22	297.46	278.77				
weight - pan		230.92	238.87	234.92	234.17	233.41	214.72				
diff from original weight			7.95	4	3.25	2.49	-16.2				
diff from previous weight			7.95	-3.95	-0.75	-0.76	-18.69				
Est h2O loss		%H2O loss				-5.46	2.29				
% mat loss during scan							7.82	10.11	303.77	235.09	750.60
5	64.33	309.24	315.38	313.38	312.42	311.7	292.03				
weight - pan		244.91	251.05	249.05	248.09	247.37	227.7				
diff from original weight			6.14	4.14	3.18	2.46	-17.21				
diff from previous weight			6.14	-2	-0.96	-0.72	-19.67				
Est h2O loss		%H2O loss				-3.68	1.47				
% mat loss during scan							7.84	9.30	380.29	320.36	799.59

Table 116. Vitremer Three-Month Thermal Weight Data

Vitremer 3 Month Thermal Weight Data — Weights in mg

2mm — 40 µl pan — ref pan weight 31.28 — ref pan weight 31.3 — 28-Dec-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	31.67	153.44	161.5	158.15	157.1	156.11	143.83				
weight - pan		121.77	129.83	126.48	125.43	124.44	112.16				
diff from original weight			8.06	4.71	3.66	2.67	-9.61				
diff from previous weight			8.06	-3.35	-1.05	-0.99	-12.28				
est H2O loss		%H2O loss				-5.39	4.15				
% mat loss during scan							9.46	13.61	219.23	152.36	459.93
2	31.52	136.95	141.74	138.6	137.75	137.21	129.19				
weight - pan		105.43	110.22	107.08	106.23	105.69	97.67				
diff from original weight			4.79	1.65	0.8	0.26	-7.76				
diff from previous weight			4.79	-3.14	-0.85	-0.54	-8.02				
Est h2O loss		%H2O loss				-4.53	4.11				
% mat loss during scan							7.28	11.39	262.00	167.43	3084.62
3	31.9	136.82	140.44	139.01	138.27	137.62	128.41				
weight - pan		104.92	108.54	107.11	106.37	105.72	96.51				
diff from original weight			3.62	2.19	1.45	0.8	-8.41				
diff from previous weight			3.62	-1.43	-0.74	-0.65	-9.21				
Est h2O loss		%H2O loss				-2.82	2.60				
% mat loss during scan							8.49	11.08	332.32	254.42	1151.25
4	31.65	129.98	134.8	132.46	131.6	130.79	120.94				
weight - pan		98.33	103.15	100.81	99.95	99.14	89.29				
diff from original weight			4.82	2.48	1.62	0.81	-9.04				
diff from previous weight			4.82	-2.34	-0.86	-0.81	-9.85				
Est h2O loss		%H2O loss				-4.01	3.89				
% mat loss during scan							9.55	13.44	287.55	204.36	1216.05
5	32.09	143.63	145.82	144.67	143.93	143.38	133.78				
weight - pan		111.54	113.73	112.58	111.84	111.29	101.69				
diff from original weight			2.19	1.04	0.3	-0.25	-9.85				
diff from previous weight			2.19	-1.15	-0.74	-0.55	-9.6				
Est h2O loss		%H2O loss				-2.44	2.15				
% mat loss during scan							8.44	10.59	549.77	438.36	-3840.00

3 mm — 100 µl pan reference wt 63.76 — ref pan weight 63.78 — 28-Dec-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	64.16	204.94	214.03	211.1	210.25	209.37	191.65				
weight - pan		140.78	149.87	146.94	146.09	145.21	127.49				
diff from original weight			9.09	6.16	5.31	4.43	-13.29				
diff from previous weight			9.09	-2.93	-0.85	-0.88	-17.72				
est H2O loss		%H2O loss				-4.66	3.11				
% mat loss during scan							11.82	14.93	246.20	194.94	400.00
2	63.55	215.83	226.34	221	220.09	219.23	205.18				
weight - pan		152.28	162.79	157.45	156.54	155.68	141.63				
diff from original weight			10.51	5.17	4.26	3.4	-10.65				
diff from previous weight			10.51	-5.34	-0.91	-0.86	-14.05				
Est h2O loss		%H2O loss				-7.11	4.37				
% mat loss during scan							8.63	13.00	201.33	133.68	413.24
3	63.43	217.2	226.12	222.63	221.67	220.67	206.42				
weight - pan		153.77	162.69	159.2	158.24	157.24	142.99				
diff from original weight			8.92	5.43	4.47	3.47	-10.78				
diff from previous weight			8.92	-3.49	-0.96	-1	-14.25				
Est h2O loss		%H2O loss				-5.45	3.35				
% mat loss during scan							8.76	12.11	220.85	159.75	410.66
4	64.33	226.45	229.7	228.42	227.87	227.15	215.29				
weight - pan		162.12	165.37	164.09	163.54	162.82	150.96				
diff from original weight			3.25	1.97	1.42	0.7	-11.16				
diff from previous weight			3.25	-1.28	-0.55	-0.72	-11.86				
Est h2O loss		%H2O loss				-2.55	1.54				
% mat loss during scan							7.17	8.71	443.38	364.92	1694.29
5	63.36	209.71	215.95	211.8	211.24	210.56	199.47				
weight - pan		146.35	152.59	148.44	147.88	147.2	136.11				
diff from original weight			6.24	2.09	1.53	0.85	-10.24				
diff from previous weight			6.24	-4.15	-0.56	-0.68	-11.09				
Est h2O loss		%H2O loss				-5.39	3.53				
% mat loss during scan							7.27	10.80	264.10	177.72	1304.71

4 mm

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	63.32	264.83	274.47	272.53	271.84	271.31	249.8				
weight - pan		201.51	211.15	209.21	208.52	207.99	186.48				
diff from original weight			9.64	7.7	7.01	6.48	-15.03				
diff from previous weight			9.64	-1.94	-0.69	-0.53	-21.51				
est H2O loss		%H2O loss				-3.16	1.50				
% mat loss during scan							10.19	11.68	255.91	223.13	331.94
2	63.15	265.23	270.75	269.31	268.74	268.31	248.02				
weight - pan		202.08	207.6	206.16	205.59	205.16	184.87				
diff from original weight			5.52	4.08	3.51	3.08	-17.21				
diff from previous weight			5.52	-1.44	-0.57	-0.43	-20.29				
Est h2O loss		%H2O loss				-2.44	1.18				
% mat loss during scan							9.77	10.95	411.78	367.57	658.77
3	64.36	253.87	270.2	261.45	260.63	259.94	238.98				
weight - pan		189.51	205.84	197.09	196.27	195.58	174.62				
diff from original weight			16.33	7.58	6.76	6.07	-14.89				
diff from previous weight			16.33	-8.75	-0.82	-0.69	-20.96				
Est h2O loss		%H2O loss				-10.26	4.98				
% mat loss during scan							10.18	15.17	191.18	128.35	345.30
4	64.35	236.56	246.5	243.85	243.13	242.52	223.1				
weight - pan		172.21	182.15	179.5	178.78	178.17	158.75				
diff from original weight			9.94	7.29	6.57	5.96	-13.46				
diff from previous weight			9.94	-2.65	-0.72	-0.61	-19.42				
Est h2O loss		%H2O loss				-3.98	2.19				
% mat loss during scan							10.66	12.85	235.41	195.37	325.84
5	64.32	256.01	267.1	264.64	264.29	263.58	243.51				
weight - pan		191.69	202.78	200.32	199.97	199.26	179.19				
diff from original weight			11.09	8.63	8.28	7.57	-12.5				
diff from previous weight			11.09	-2.46	-0.35	-0.71	-20.07				
Est h2O loss		%H2O loss				-3.52	1.74				
% mat loss during scan							9.90	11.63	212.71	180.97	265.13

Table 117. Fuji II LC Immediate Thermal Weight Data

Fuji II LC Immediate Thermal Weight Data Weights in mg

2mm 40 µl pan

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss
1	32.82	144.53	144.53	144.21	143.98	143.8	139.11	
weight - pan		111.71	111.71	111.39	111.16	110.98	106.29	
diff from original weight			0	-0.32	-0.55	-0.73	-5.42	
diff from previous weight			0	-0.32	-0.23	-0.18	-4.69	
est H2O loss		%H2O loss				-0.73	0.65	
% mat loss during scan							4.20	4.85
2	33.21	160.97	160.97	160.54	160.38	160.15	154.78	
weight - pan		127.76	127.76	127.33	127.17	126.94	121.57	
diff from original weight			0	-0.43	-0.59	-0.82	-6.19	
diff from previous weight			0	-0.43	-0.16	-0.23	-5.37	
Est h2O loss		%H2O loss				-0.82	0.64	
% mat loss during scan							4.20	4.85
3	32.83	136.21	136.21	135.98	135.71	135.62	131.24	
weight - pan		103.38	103.38	103.15	102.88	102.79	98.41	
diff from original weight			0	-0.23	-0.5	-0.59	-4.97	
diff from previous weight			0	-0.23	-0.27	-0.09	-4.38	
Est h2O loss		%H20 loss				-0.59	0.57	
% mat loss during scan							4.24	4.81
4	32.91	108	108	107.6	107.53	107.35	104.74	
weight - pan		75.09	75.09	74.69	74.62	74.44	71.83	
diff from original weight			0	-0.4	-0.47	-0.65	-3.26	
diff from previous weight			0	-0.4	-0.07	-0.18	-2.61	
Est h2O loss		%H2O loss				-0.65	0.87	
% mat loss during scan							3.48	4.34
							0.00	
5	32.73	121.11	121.11	120.76	120.62	120.43	117.62	
weight - pan		88.38	88.38	88.03	87.89	87.7	84.89	
diff from original weight			0	-0.35	-0.49	-0.68	-3.49	
diff from previous weight			0	-0.35	-0.14	-0.19	-2.81	
Est h2O loss						-0.68	0.77	
% mat loss during scan							3.18	3.95

	(mg)	stand dev
Mean start weight	101.26	20.41
Mean H20 gain	0.00	0.00
Mean H2O loss	-0.60	0.09
Mean change HC1	-0.35	0.08
Mean change HC2	-0.17	0.08
Mean change HC3	-0.17	0.05
Mean change scan	-3.97	1.21
Mean % loss scan	3.86	0.50
Mean % total loss	4.56	0.40

3 mm 100 µl pan reference wt 63.76
ref pan weight

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1	60.8	231.59	231.59	231.28	231.03	230.79	223.45	
weight - pan		170.79	170.79	170.48	170.23	169.99	162.65	
diff from original weight			0	-0.31	-0.56	-0.8	-8.14	
diff from previous weight			0	-0.31	-0.25	-0.24	-7.34	
est H2O loss		%H20 loss				-0.8	0.47	
% mat loss during scan							4.30	4.77
2	61.54	251.15	251.15	250.79	250.43	250.3	241.60	
weight - pan		189.61	189.61	189.25	188.89	188.76	180.06	
diff from original weight			0	-0.36	-0.72	-0.85	-9.55	
diff from previous weight			0	-0.36	-0.36	-0.13	-8.70	
Est h2O loss		%H20 loss				-0.85	0.45	
% mat loss during scan							4.59	5.04
3	61.82	236.14	236.14	235.76	235.56	235.28	227.63	
weight - pan		174.32	174.32	173.94	173.74	173.46	165.81	
diff from original weight			0	-0.38	-0.58	-0.86	-8.51	
diff from previous weight			0	-0.38	-0.2	-0.28	-7.65	
Est h2O loss		%H20 loss				-0.86	0.49	
% mat loss during scan							4.39	4.88
4	61.56	202.91	202.91	201.54	201.29	201.12	195.12	
weight - pan		141.35	141.35	139.98	139.73	139.56	133.56	
diff from original weight			0	-1.37	-1.62	-1.79	-7.79	
diff from previous weight			0	-1.37	-0.25	-0.17	-6.00	
Est h2O loss		%H20 loss				-1.79	1.27	
% mat loss during scan							4.24	5.51
5	61.68	239.95	239.95	239.65	239.42	239.2	230.98	
weight - pan		178.27	178.27	177.97	177.74	177.52	169.30	
diff from original weight			0	-0.3	-0.53	-0.75	-8.97	
diff from previous weight			0	-0.3	-0.23	-0.22	-8.22	
Est h2O loss		%H20 loss				-0.75	0.42	
% mat loss during scan							4.61	5.03

	(mg)	stand dev
Mean start weight	170.87	17.95
Mean H20 gain	0.00	0.00
Mean H2O loss	-0.90	0.44
Mean change HC1	-0.54	0.46
Mean change HC2	-0.26	0.06
Mean change HC3	-0.21	0.06
Mean change scan	-7.58	1.03
Mean % loss scan	4.43	0.17
Mean % total loss	5.05	0.28

4 mm

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1	61.83	314.96	314.96	314.57	314.35	314.14	302.5	
weight - pan		253.13	253.13	252.74	252.52	252.31	240.67	
diff from original weight			0	-0.39	-0.61	-0.82	-12.46	
diff from previous weight			0	-0.39	-0.22	-0.21	-11.64	
est H2O loss		%H20 loss				-0.82	0.32	
% mat loss during scan							4.60	4.92
2	61.24	315.28	315.28	314.75	314.42	314.24	301.57	
weight - pan		254.04	254.04	253.51	253.18	253	240.33	
diff from original weight			0	-0.53	-0.86	-1.04	-13.71	
diff from previous weight			0	-0.53	-0.33	-0.18	-12.67	
Est h2O loss		%H20 loss				-1.04	0.41	
% mat loss during scan							4.99	5.40
3	61.79	349.42	349.42	349.13	348.91	348.69	335.37	
weight - pan		287.63	287.63	287.34	287.12	286.9	273.58	
diff from original weight			0	-0.29	-0.51	-0.73	-14.05	
diff from previous weight			0	-0.29	-0.22	-0.22	-13.32	
Est h2O loss		%H20 loss				-0.73	0.25	
% mat loss during scan							4.63	4.88
4	61.77	342.1	342.1	341.72	341.45	341.26	328.12	
weight - pan		280.33	280.33	279.95	279.68	279.49	266.35	
diff from original weight			0	-0.38	-0.65	-0.84	-13.98	
diff from previous weight			0	-0.38	-0.27	-0.19	-13.14	
Est h2O loss		%H20 loss				-0.84	0.30	
% mat loss during scan							4.69	4.99
5	61.09	336.9	336.9	336.51	336.28	336.06	322.87	
weight - pan		275.81	275.81	275.42	275.19	274.97	261.78	
diff from original weight			0	-0.39	-0.62	-0.84	-14.03	
diff from previous weight			0	-0.39	-0.23	-0.22	-13.19	
Est h2O loss		%H20 loss				-0.84	0.30	
% mat loss during scan							4.78	5.09

	(mg)	stand dev
Mean start weight	270.19	15.74
Mean H20 gain	0.00	0.00
Mean H2O loss	-0.73	0.11
Mean change HC1	-0.40	0.09
Mean change HC2	-0.25	0.05
Mean change HC3	-0.20	0.02
Mean change scan	-12.79	0.69
Mean % loss scan	4.74	0.16
Mean % total loss	5.06	0.21

Table 118. Fuji II LC 24-Hour Thermal Weight Data

Fuji II LC 24 Hour Thermal Weight Data — Weights in mg

2mm — 40 µl pan — ref pan weight 33.03 06-Oct-05; ref pan weight 33.11 07-Nov-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	32.95	148.09	152.9	150.37	149.7	149.07	142.55				
weight - pan		115.14	119.95	117.42	116.75	116.12	109.60				
diff from original weight			4.81	2.28	1.61	0.98	-5.54				
diff from previous weight			4.81	-2.53	-0.67	-0.63	-6.52				
est H2O loss		%H2O loss				-3.83	3.19				
% mat loss during scan							5.44	8.63	215.18	135.55	665.31
2	32.7	149.4	153.58	151.46	150.66	150.05	143.99				
weight - pan		116.7	120.88	118.76	117.96	117.35	111.29				
diff from original weight			4.18	2.06	1.26	0.65	-5.41				
diff from previous weight			4.18	-2.12	-0.8	-0.61	-6.06				
Est h2O loss		%H2O loss				-3.53	2.92				
% mat loss during scan							5.01	7.93	229.43	144.98	932.31
3	33.12	130.99	134.58	132.32	131.75	131.29	126.52				
weight - pan		97.87	101.46	99.2	98.63	98.17	93.40				
diff from original weight			3.59	1.33	0.76	0.3	-4.47				
diff from previous weight			3.59	-2.26	-0.57	-0.46	-4.77				
Est h2O loss		%H2O loss				-3.29	3.24				
% mat loss during scan							4.70	7.94	224.51	132.87	1590.00
4	32.94	122.61	125.75	123.61	123.06	122.6	117.93				
weight - pan		89.67	92.81	90.67	90.12	89.66	84.99				
diff from original weight			3.14	1	0.45	-0.01	-4.68				
diff from previous weight			3.14	-2.14	-0.55	-0.46	-4.67				
Est h2O loss		%H2O loss				-3.15	3.39				
% mat loss during scan							5.03	8.43	249.04	148.73	-46700.00
5	32.59	117.92	119.98	118.84	118.3	117.84	113.58				
weight - pan		85.33	87.39	86.25	85.71	85.25	80.99				
diff from original weight			2.06	0.92	0.38	-0.08	-4.34				
diff from previous weight			2.06	-1.14	-0.54	-0.46	-4.26				
Est h2O loss		%H2O loss				-2.14	2.45				
% mat loss during scan							4.87	7.32	310.68	206.80	-5325.00

3 mm — 100 µl pan — reference wt 63.76; ref pan weight 63.74 07-Nov-05

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	63.75	235.42	236.82	235.91	235.52	235.21	226.67				
weight - pan		171.67	173.07	172.16	171.77	171.46	162.92				
diff from original weight			1.4	0.49	0.1	-0.21	-8.75				
diff from previous weight			1.4	-0.91	-0.39	-0.31	-8.54				
est H2O loss		%H2O loss				-1.61	0.93				
% mat loss during scan							4.93	5.86	725.00	610.00	-4066.67
2	63.79	258.08	259.78	258.96	258.5	258.17	248.78				
weight - pan		194.29	195.99	195.17	194.71	194.38	184.99				
diff from original weight			1.7	0.88	0.42	0.09	-9.30				
diff from previous weight			1.7	-0.82	-0.46	-0.33	-9.39				
Est h2O loss		%H2O loss				-1.61	0.82				
% mat loss during scan							4.79	5.61	647.06	552.35	10433.33
3	61.56	228.4	230.26	229.31	228.98	228.5	219.97				
weight - pan		166.84	168.7	167.75	167.42	166.94	158.41				
diff from original weight			1.86	0.91	0.58	0.1	-8.43				
diff from previous weight			1.86	-0.95	-0.33	-0.48	-8.53				
Est h2O loss		%H2O loss				-1.76	1.04				
% mat loss during scan							5.06	6.10	553.23	458.60	8530.00
4	61.71	228.86	230.86	229.84	229.39	228.96	220.80				
weight - pan		167.15	169.15	168.13	167.68	167.25	159.09				
diff from original weight			2	0.98	0.53	0.1	-8.06				
diff from previous weight			2	-1.02	-0.45	-0.43	-8.16				
Est h2O loss		%H2O loss				-1.9	1.12				
% mat loss during scan							4.82	5.95	503.00	408.00	8160.00
5	61.42	258.52	260.63	259.71	259.28	258.85	248.94				
weight - pan		197.1	199.21	198.29	197.86	197.43	187.52				
diff from original weight			2.11	1.19	0.76	0.33	-9.58				
diff from previous weight			2.11	-0.92	-0.43	-0.43	-9.91				
Est h2O loss		%H2O loss				-1.78	0.89				
% mat loss during scan							4.97	5.87	554.03	469.67	3003.03

4 mm

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	61.84	334.34	336.51	335.58	335.03	334.47	320.90				
weight - pan		272.5	274.67	273.74	273.19	272.63	259.06				
diff from original weight			2.17	1.24	0.69	0.13	-13.44				
diff from previous weight			2.17	-0.93	-0.55	-0.56	-13.57				
est H2O loss		%H2O loss				-2.04	0.74				
% mat loss during scan							4.94	5.68	719.35	625.35	10438.46
2	61.48	322.86	325.55	324.58	323.95	323.49	309.77				
weight - pan		261.38	264.07	263.1	262.47	262.01	248.29				
diff from original weight			2.69	1.72	1.09	0.63	-13.09				
diff from previous weight			2.69	-0.97	-0.63	-0.46	-13.72				
Est h2O loss		%H2O loss				-2.06	0.78				
% mat loss during scan							5.20	5.98	586.62	510.04	2177.78
3	61.31	346.65	350.04	348.83	348.01	347.5	332.58				
weight - pan		285.34	288.73	287.52	286.7	286.19	271.27				
diff from original weight			3.39	2.18	1.36	0.85	-14.07				
diff from previous weight			3.39	-1.21	-0.82	-0.51	-14.92				
Est h2O loss		%H2O loss				-2.54	0.88				
% mat loss during scan							5.17	6.05	515.04	440.12	1755.29
4	62.07	348.96	352.01	350.62	349.87	349.26	335.74				
weight - pan		286.89	289.94	288.55	287.8	287.19	273.67				
diff from original weight			3.05	1.66	0.91	0.3	-13.22				
diff from previous weight			3.05	-1.39	-0.75	-0.61	-13.52				
Est h2O loss		%H2O loss				-2.75	0.95				
% mat loss during scan							4.66	5.61	533.44	443.28	4506.67
5	61.45	314.63	317.53	316.36	315.68	315.26	302.29				
weight - pan		253.18	256.08	254.91	254.23	253.81	240.84				
diff from original weight			2.9	1.73	1.05	0.63	-12.34				
diff from previous weight			2.9	-1.17	-0.68	-0.42	-12.97				
Est h2O loss		%H2O loss				-2.27	0.89				
% mat loss during scan							5.06	5.95	525.52	447.24	2058.73

Table 119. Fuji II LC One-Week Thermal Weight Data

Fuji II LC 1 Week Thermal Weight Data — Weights in mg

2mm — 40 µl pan — ref pan weight 32.9 (03-Jan-06); ref pan weight 33.03 (11-Jan-06)

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	32.65	112.82	116.94	114.24	113.85	113.53	108.67				
weight - pan		80.17	84.29	81.59	81.2	80.88	76.02				
diff from original weight			4.12	1.42	1.03	0.71	-4.15				
diff from previous weight			4.12	-2.7	-0.39	-0.32	-4.86				
est H2O loss		%H2O loss				-3.41	4.05				
% mat loss during scan							4.28	9.81	200.73	117.96	684.51
2	33.12	125.34	128.28	127.07	126.68	126.36	121.00				
weight - pan		92.22	95.16	93.95	93.56	93.24	87.88				
diff from original weight			2.94	1.73	1.34	1.02	-4.34				
diff from previous weight			2.94	-1.21	-0.39	-0.32	-5.36				
Est h2O loss		%H2O loss				-1.92	2.02				
% mat loss during scan							4.24	7.65	247.62	182.31	525.49
3	32.82	140.87	146.3	143.53	142.98	142.43	135.60				
weight - pan		108.05	113.48	110.71	110.16	109.61	102.78				
diff from original weight			5.43	2.66	2.11	1.56	-5.27				
diff from previous weight			5.43	-2.77	-0.55	-0.55	-6.83				
Est h2O loss		%H2O loss				-3.87	3.41				
% mat loss during scan							4.80	9.43	197.05	125.78	437.82
4	33.03	136.92	141.27	139.4	138.78	138.26	131.94				
weight - pan		103.89	108.24	106.37	105.75	105.23	98.91				
diff from original weight			4.35	2.48	1.86	1.34	-4.98				
diff from previous weight			4.35	-1.87	-0.62	-0.52	-6.32				
Est h2O loss		%H2O loss				-3.01	2.78				
% mat loss during scan							4.57	8.62	214.48	145.29	471.64
5	33.31	123.05	129.48	124.47	124.46	124.11	118.74				
weight - pan		89.74	96.17	91.16	91.15	90.8	85.43				
diff from original weight			6.43	1.42	1.41	1.06	-4.31				
diff from previous weight			6.43	-5.01	-0.01	-0.35	-5.37				
Est h2O loss		%H2O loss				-5.37	6.58				
% mat loss during scan							4.33	11.17	167.03	83.51	506.60

3 mm — 100 µl pan reference wt 61.76; ref pan weight 61.78 (12-Jan-06)

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	61.1	240.63	248.1	246.1	245.06	244.49	231.79				
weight - pan		179.53	187	185	183.96	183.39	170.69				
diff from original weight			7.47	5.47	4.43	3.86	-8.84				
diff from previous weight			7.47	-2	-1.04	-0.57	-12.70				
est H2O loss		%H2O loss				-3.61	1.93				
% mat loss during scan							5.19	8.72	218.34	170.01	329.02
2	61.55	222.16	229.6	226.54	225.92	225.4	214.31				
weight - pan		160.61	168.05	164.99	164.37	163.85	152.76				
diff from original weight			7.44	4.38	3.76	3.24	-7.85				
diff from previous weight			7.44	-3.06	-0.62	-0.52	-11.09				
Est h2O loss		%H2O loss				-4.2	2.50				
% mat loss during scan							4.92	9.10	205.51	149.06	342.28
3	61.34	229.68	237.8	234.65	233.86	233.24	221.40				
weight - pan		168.34	176.46	173.31	172.52	171.9	160.06				
diff from original weight			8.12	4.97	4.18	3.56	-8.28				
diff from previous weight			8.12	-3.15	-0.79	-0.62	-11.84				
Est h2O loss		%H2O loss				-4.56	2.58				
% mat loss during scan							5.08	9.29	201.97	145.81	332.58
4	61.22	249.4	258.64	254.2	253.62	253.09	240.06				
weight - pan		188.18	197.42	192.98	192.4	191.87	178.84				
diff from original weight			9.24	4.8	4.22	3.69	-9.34				
diff from previous weight			9.24	-4.44	-0.58	-0.53	-13.03				
Est h2O loss		%H2O loss				-5.55	2.81				
% mat loss during scan							5.15	9.41	201.08	141.02	353.12
5	61.33	254.61	260.3	258.8	258.3	257.83	244.63				
weight - pan		193.28	198.97	197.47	196.97	196.5	183.30				
diff from original weight			5.69	4.19	3.69	3.22	-9.98				
diff from previous weight			5.69	-1.5	-0.5	-0.47	-13.20				
Est h2O loss		%H2O loss				-2.47	1.24				
% mat loss during scan							5.12	7.88	275.40	231.99	409.94

4 mm

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	61.37	327.09	334.8	333.36	332.57	331.83	313.36				
weight - pan		265.72	273.43	271.99	271.2	270.46	251.99				
diff from original weight			7.71	6.27	5.48	4.74	-13.73				
diff from previous weight			7.71	-1.44	-0.79	-0.74	-18.47				
est H2O loss		%H2O loss				-2.97	1.09				
% mat loss during scan							5.57	7.84	278.08	239.56	389.66
2	61.78	317.62	328.22	324.43	323.58	323.01	305.01				
weight - pan		255.84	266.44	262.65	261.8	261.23	243.23				
diff from original weight			10.6	6.81	5.96	5.39	-12.61				
diff from previous weight			10.6	-3.79	-0.85	-0.57	-18.00				
Est h2O loss		%H2O loss				-5.21	1.96				
% mat loss during scan							5.57	8.71	218.96	169.81	333.95
3	61.69	305.1	317.93	310.4	309.77	309.27	293.38				
weight - pan		243.41	256.24	248.71	248.08	247.58	231.69				
diff from original weight			12.83	5.3	4.67	4.17	-11.72				
diff from previous weight			12.83	-7.53	-0.63	-0.5	-15.89				
Est h2O loss		%H2O loss				-8.66	3.38				
% mat loss during scan							5.14	9.58	191.35	123.85	381.06
4	61.64	327.21	334.85	333.08	332.47	331.93	314.00				
weight - pan		265.57	273.21	271.44	270.83	270.29	252.36				
diff from original weight			7.64	5.87	5.26	4.72	-13.21				
diff from previous weight			7.64	-1.77	-0.61	-0.54	-17.93				
Est h2O loss		%H2O loss				-2.92	1.07				
% mat loss during scan							5.40	7.63	272.91	234.69	379.87
5	61.76	314.65	322.46	319.88	319.2	318.62	302.12				
weight - pan		252.89	260.7	258.12	257.44	256.86	240.36				
diff from original weight			7.81	5.23	4.55	3.97	-12.53				
diff from previous weight			7.81	-2.58	-0.68	-0.58	-16.50				
Est h2O loss		%H2O loss				-3.84	1.47				
% mat loss during scan							5.18	7.80	260.44	211.27	415.62

Table 120. Fuji II LC One-Month Thermal Weight Data

Fuji II LC 1 Month Thermal Weight Data — Weights in mg

2mm — 40 µl pan — ref pan weight 33.03 06-Oct-05; ref pan weight 33.11 11-Nov-05

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	33.01	96.51	100.14	97.84	97.39	96.95	93.41				
weight - pan		63.5	67.13	64.83	64.38	63.94	60.40				
diff from original weight			3.63	1.33	0.88	0.44	-3.10				
diff from previous weight			3.63	-2.3	-0.45	-0.44	-3.54				
est H2O loss		%H2O loss				-3.19	4.75				
% mat loss during scan							5.27	10.03	185.40	97.52	804.55
2	32.93	145.72	149.35	148.11	147.6	147.2	140.29				
weight - pan		112.79	116.42	115.18	114.67	114.27	107.36				
diff from original weight			3.63	2.39	1.88	1.48	-5.43				
diff from previous weight			3.63	-1.24	-0.51	-0.4	-6.91				
Est h2O loss		%H2O loss				-2.16	1.05				
% mat loss during scan							5.94	7.78	249.59	190.36	466.89
3	32.98	112.32	115.04	113.96	113.62	113.09	108.38				
weight - pan		79.34	82.06	80.98	80.64	80.11	75.40				
diff from original weight			2.72	1.64	1.3	0.77	-3.94				
diff from previous weight			2.72	-1.08	-0.34	-0.53	-4.71				
Est h2O loss		%H2O loss				-1.95	2.38				
% mat loss during scan							5.74	8.12	244.85	173.16	611.69
4	32.96	136.21	139.92	138.88	138.11	137.61	130.89				
weight - pan		103.25	106.96	105.92	105.15	104.65	97.93				
diff from original weight			3.71	2.67	1.9	1.4	-5.32				
diff from previous weight			3.71	-1.04	-0.77	-0.5	-6.72				
Est h2O loss		%H2O loss				-2.31	2.16				
% mat loss during scan							6.28	8.44	243.40	181.13	480.00
5	32.75	126.68	131.12	129.25	128.4	127.98	122.55				
weight - pan		93.93	98.37	96.5	95.65	95.23	89.80				
diff from original weight			4.44	2.57	1.72	1.3	-4.13				
diff from previous weight			4.44	-1.87	-0.85	-0.42	-5.43				
Est h2O loss		%H2O loss				-3.14	3.19				
% mat loss during scan							5.52	8.71	193.02	122.30	417.69

3 mm — 100 µl pan reference wt 63.76 06-Oct-05; ref pan weight 63.74 07-Nov-05

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	63.26	258.29	264.8	263.65	263.1	262.34	248.04				
weight - pan		195.03	201.54	200.39	199.84	199.08	184.78				
diff from original weight			6.51	5.36	4.81	4.05	-10.25				
diff from previous weight			6.51	-1.15	-0.55	-0.76	-14.30				
est H2O loss		%H2O loss				-2.46	1.22				
% mat loss during scan							7.10	8.32	257.45	219.66	353.09
2	62.62	235.92	243.35	240.75	240.21	239.58	227.04				
weight - pan		173.3	180.73	178.13	177.59	176.96	164.42				
diff from original weight			7.43	4.83	4.29	3.66	-8.88				
diff from previous weight			7.43	-2.6	-0.54	-0.63	-12.54				
Est h2O loss		%H2O loss				-3.77	2.09				
% mat loss during scan							6.94	9.02	219.52	168.78	342.62
3	64	247.68	254.37	252.03	251.48	250.86	238.07				
weight - pan		183.68	190.37	188.03	187.48	186.86	174.07				
diff from original weight			6.69	4.35	3.8	3.18	-9.61				
diff from previous weight			6.69	-2.34	-0.55	-0.62	-12.79				
Est h2O loss		%H2O loss				-3.51	1.84				
% mat loss during scan							6.72	8.56	243.65	191.18	402.20
4	63.25	257.45	264.43	263	262.18	261.77	247.67				
weight - pan		194.2	201.18	199.75	198.93	198.52	184.42				
diff from original weight			6.98	5.55	4.73	4.32	-9.78				
diff from previous weight			6.98	-1.43	-0.82	-0.41	-14.10				
Est h2O loss		%H2O loss				-2.66	1.32				
% mat loss during scan							7.01	8.33	240.11	202.01	326.39
5	64.26	261.87	268.33	267.2	266.64	266.11	251.31				
weight - pan		197.61	204.07	202.94	202.38	201.85	187.05				
diff from original weight			6.46	5.33	4.77	4.24	-10.56				
diff from previous weight			6.46	-1.13	-0.56	-0.53	-14.80				
Est h2O loss		%H2O loss				-2.22	1.09				
% mat loss during scan							7.25	8.34	263.47	229.10	349.06

4 mm

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	64.27	322.79	330.88	329.6	329.04	328.48	309.52				
weight - pan		258.52	266.61	265.33	264.77	264.21	245.25				
diff from original weight			8.09	6.81	6.25	5.69	-13.27				
diff from previous weight			8.09	-1.28	-0.56	-0.56	-18.96				
est H2O loss		%H2O loss				-2.4	0.90				
% mat loss during scan							7.11	8.01	264.03	234.36	333.22
2	64.67	314.62	322.61	321.09	320.55	320.1	301.61				
weight - pan		249.95	257.94	256.42	255.88	255.43	236.94				
diff from original weight			7.99	6.47	5.93	5.48	-13.01				
diff from previous weight			7.99	-1.52	-0.54	-0.45	-18.49				
Est h2O loss		%H2O loss				-2.51	0.97				
% mat loss during scan							7.17	8.14	262.83	231.41	337.41
3	64.05	300.28	308.14	306.37	305.63	305.11	287.66				
weight - pan		236.23	244.09	242.32	241.58	241.06	223.61				
diff from original weight			7.86	6.09	5.35	4.83	-12.62				
diff from previous weight			7.86	-1.77	-0.74	-0.52	-17.45				
Est h2O loss		%H2O loss				-3.03	1.24				
% mat loss during scan							7.15	8.39	260.56	222.01	361.28
4	63.21	314.03	322.12	320.89	320.22	319.54	301.62				
weight - pan		250.82	258.91	257.68	257.01	256.33	238.41				
diff from original weight			8.09	6.86	6.19	5.51	-12.41				
diff from previous weight			8.09	-1.23	-0.67	-0.68	-17.92				
Est h2O loss		%H2O loss				-2.58	1.00				
% mat loss during scan							6.92	7.92	253.40	221.51	325.23
5	62.89	319.9	328.1	326.61	325.84	325.37	306.91				
weight - pan		257.01	265.21	263.72	262.95	262.48	244.02				
diff from original weight			8.2	6.71	5.94	5.47	-12.99				
diff from previous weight			8.2	-1.49	-0.77	-0.47	-18.46				
Est h2O loss		%H2O loss				-2.73	1.03				
% mat loss during scan							6.96	7.99	258.41	225.12	337.48

Table 121. Fuji II LC Three-Month Thermal Weight Data

Fuji II LC 3 Month TI DSC DEPTH OF CURE — Weights in mg

2mm 40 µl pan ref pan weight 33.14 04-Oct-05
ref pan weight 33.13 04-Jan-06

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	32.83	113.6	115.66	114.73	114.39	114.06	109.48				
weight - pan		80.77	82.83	81.9	81.56	81.23	76.65				
diff from original weight			2.06	1.13	0.79	0.46	-4.12				
diff from previous weight			2.06	-0.93	-0.34	-0.33	-4.58				
est H2O loss		%H2O loss				-1.6	1.93				
% mat loss during scan							4.02	7.46	300.00	222.33	995.65
2	32.91	108.7	110.52	109.85	109.47	109.19	105.16				
weight - pan		75.79	77.61	76.94	76.56	76.28	72.25				
diff from original weight			1.82	1.15	0.77	0.49	-3.54				
diff from previous weight			1.82	-0.67	-0.38	-0.28	-4.03				
Est h2O loss		%H2O loss				-1.33	1.71				
% mat loss during scan							3.69	6.91	294.51	221.43	822.45
3	32.95	108.77	110.12	109.32	108.99	108.62	104.77				
weight - pan		75.82	77.17	76.37	76.04	75.67	71.82				
diff from original weight			1.35	0.55	0.22	-0.15	-4.00				
diff from previous weight			1.35	-0.8	-0.33	-0.37	-3.85				
Est h2O loss		%H2O loss				-1.5	1.94				
% mat loss during scan							3.54	6.93	396.30	285.19	-2566.67
4	33.42	115.58	117.6	116.87	116.68	116.23	111.47				
weight - pan		82.16	84.18	83.45	83.26	82.81	78.05				
diff from original weight			2.02	1.29	1.1	0.65	-4.11				
diff from previous weight			2.02	-0.73	-0.19	-0.45	-4.76				
Est h2O loss		%H2O loss				-1.37	1.63				
% mat loss during scan							4.10	7.28	303.47	235.64	732.31
5	32.81	126.35	128.7	127.95	127.55	127.29	121.77				
weight - pan		93.54	95.89	95.14	94.74	94.48	88.96				
diff from original weight			2.35	1.6	1.2	0.94	-4.58				
diff from previous weight			2.35	-0.75	-0.4	-0.26	-5.52				
Est h2O loss		%H2O loss				-1.41	1.47				
% mat loss during scan							4.34	7.23	294.89	234.89	587.23

3 mm 100 µl pan reference wt 63.45 04-Oct-05
ref pan weight 63.47 04-Jan-06

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	64.19	216.01	219.63	218.96	218.5	218.14	208.24				
weight - pan		151.82	155.44	154.77	154.31	153.95	144.05				
diff from original weight			3.62	2.95	2.49	2.13	-7.77				
diff from previous weight			3.62	-0.67	-0.46	-0.36	-9.90				
est H2O loss		%H2O loss				-1.49	0.96				
% mat loss during scan							4.54	7.33	314.64	273.48	464.79
2	63.95	233.64	238.22	237.2	236.54	236.2	225.00				
weight - pan		169.69	174.27	173.25	172.59	172.25	161.05				
diff from original weight			4.58	3.56	2.9	2.56	-8.64				
diff from previous weight			4.58	-1.02	-0.66	-0.34	-11.20				
Est h2O loss		%H2O loss				-2.02	1.16				
% mat loss during scan							4.74	7.59	288.65	244.54	437.50
3	64.06	208.48	212.03	211.29	211.01	210.56	201.01				
weight - pan		144.42	147.97	147.23	146.95	146.5	136.95				
diff from original weight			3.55	2.81	2.53	2.08	-7.47				
diff from previous weight			3.55	-0.74	-0.28	-0.45	-9.55				
Est h2O loss		%H2O loss				-1.47	0.99				
% mat loss during scan							4.54	7.45	310.42	269.01	459.13
4	64.24	245.48	250.2	249.4	248.91	248.4	236.26				
weight - pan		181.24	185.96	185.16	184.67	184.16	172.02				
diff from original weight			4.72	3.92	3.43	2.92	-9.22				
diff from previous weight			4.72	-0.8	-0.49	-0.51	-12.14				
Est h2O loss		%H2O loss				-1.8	0.97				
% mat loss during scan							4.89	7.50	295.34	257.20	415.75
5	64.64	237.05	241.35	240.56	240.03	239.7	228.39				
weight - pan		172.41	176.71	175.92	175.39	175.06	163.75				
diff from original weight			4.3	3.51	2.98	2.65	-8.66				
diff from previous weight			4.3	-0.79	-0.53	-0.33	-11.31				
Est h2O loss		%H2O loss				-1.65	0.93				
% mat loss during scan							4.72	7.33	301.40	263.02	426.79

4 mm

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/H2Oret%
1	63.61	301.86	308.5	307.71	307.24	306.8	289.98				
weight - pan		238.25	244.89	244.1	243.63	243.19	226.37				
diff from original weight			6.64	5.85	5.38	4.94	-11.88				
diff from previous weight			6.64	-0.79	-0.47	-0.44	-16.82				
est H2O loss		%H2O loss				-1.7	0.69				
% mat loss during scan							5.48	7.56	278.92	253.31	340.49
2	63.82	305.74	311.67	310.92	310.59	310.22	293.84				
weight - pan		241.92	247.85	247.1	246.77	246.4	230.02				
diff from original weight			5.93	5.18	4.85	4.48	-11.90				
diff from previous weight			5.93	-0.75	-0.33	-0.37	-16.38				
Est h2O loss		%H2O loss				-1.45	0.59				
% mat loss during scan							5.28	7.19	300.67	276.22	365.63
3	64.01	312.58	318.12	317.4	317.04	316.72	301.40				
weight - pan		248.57	254.11	253.39	253.03	252.71	237.39				
diff from original weight			5.54	4.82	4.46	4.14	-11.18				
diff from previous weight			5.54	-0.72	-0.36	-0.32	-15.32				
Est h2O loss		%H2O loss				-1.4	0.56				
% mat loss during scan							4.84	6.58	301.81	276.53	370.05
4	63.59	304.05	310.39	309.36	308.74	308.25	292.23				
weight - pan		240.46	246.8	245.77	245.15	244.66	228.64				
diff from original weight			6.34	5.31	4.69	4.2	-11.82				
diff from previous weight			6.34	-1.03	-0.62	-0.49	-16.02				
Est h2O loss		%H2O loss				-2.14	0.87				
% mat loss during scan							5.20	7.36	286.44	252.68	381.43
5	63.56	289.38	295.56	294.68	294.16	293.74	277.28				
weight - pan		225.82	232	231.12	230.6	230.18	213.72				
diff from original weight			6.18	5.3	4.78	4.36	-12.10				
diff from previous weight			6.18	-0.88	-0.52	-0.42	-16.46				
Est h2O loss		%H2O loss				-1.82	0.78				
% mat loss during scan							5.60	7.88	295.79	266.34	377.52

Table 122. Photac-Fil Quick Immediate Thermal Weight Data

Photac-Fil Quick Immediate Thermal Weight Data Weights in mg

2mm 40 µl pan ref pan weight 33.1

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss
1	30.98	106.04	106.04	105.71	105.45	105.19	102.05	
weight - pan		75.06	75.06	74.73	74.47	74.21	71.07	
diff from original weight			0	-0.33	-0.59	-0.85	-3.99	
diff from previous weight			0	-0.33	-0.26	-0.26	-3.14	
est H2O loss		%H2O loss				-0.85	1.13	
% mat loss during scan							4.18	5.32
2	31.3	113.59	113.59	113.28	113.02	112.85	109.48	
weight - pan		82.29	82.29	81.98	81.72	81.55	78.18	
diff from original weight			0	-0.31	-0.57	-0.74	-4.11	
diff from previous weight			0	-0.31	-0.26	-0.17	-3.37	
Est h2O loss		%H2O loss				-0.74	0.90	
% mat loss during scan							4.10	4.99
3	32.85	104.16	101.46	101.2	100.97	100.78	97.82	
weight - pan		71.31	68.61	68.35	68.12	67.93	64.97	
diff from original weight			-2.7	-2.96	-3.19	-3.38	-6.34	
diff from previous weight			-2.7	-0.26	-0.23	-0.19	-2.96	
Est h2O loss		%H2O loss				-0.68	0.99	
% mat loss during scan							4.31	5.31
4	33.44	109.23	109.23	108.74	108.53	108.38	105.44	
weight - pan		75.79	75.79	75.3	75.09	74.94	72.00	
diff from original weight			0	-0.49	-0.7	-0.85	-3.79	
diff from previous weight			0	-0.49	-0.21	-0.15	-2.94	
Est h2O loss		%H2O loss				-0.85	1.12	
% mat loss during scan							3.88	5.00
5	31.54	123.95	123.95	123.58	123.42	123.26	118.67	
weight - pan		92.41	92.41	92.04	91.88	91.72	87.13	
diff from original weight			0	-0.37	-0.53	-0.69	-5.28	
diff from previous weight			0	-0.37	-0.16	-0.16	-4.59	
Est h2O loss		%H2O loss				-0.69	0.75	
% mat loss during scan							4.97	5.71

	(mg)	stand dev
Mean start weight	79.37	8.29
Mean H20 gain	-0.54	1.21
Mean H2O loss	-0.66	0.08
Mean change HC1	-0.35	0.09
Mean change HC2	-0.22	0.04
Mean change HC3	-0.19	0.04
Mean change scan	-3.40	0.69
Mean % loss scan	4.29	0.41
Mean % total loss	5.27	0.30

3 mm 100 µl pan reference wt 63.74

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1	61.26	259.12	259.12	258.61	258.36	258.1	248.24	
weight - pan		197.86	197.86	197.35	197.1	196.84	186.98	
diff from original weight			0	-0.51	-0.76	-1.02	-10.88	
diff from previous weight			0	-0.51	-0.25	-0.26	-9.86	
est H2O loss		%H2O loss				-1.02	0.52	
% mat loss during scan							4.98	5.50
2	61.25	268.09	268.09	267.53	267.22	267.04	256.50	
weight - pan		206.84	206.84	206.28	205.97	205.79	195.25	
diff from original weight			0	-0.56	-0.87	-1.05	-11.59	
diff from previous weight			0	-0.56	-0.31	-0.18	-10.54	
Est h2O loss		%H2O loss				-1.05	0.51	
% mat loss during scan							5.10	5.60
3	61.3	254.46	254.46	253.9	253.68	253.44	247.64	
weight - pan		193.16	193.16	192.6	192.38	192.14	186.34	
diff from original weight			0	-0.56	-0.78	-1.02	-6.82	
diff from previous weight			0	-0.56	-0.22	-0.24	-5.80	
Est h2O loss		%H2O loss				-1.02	0.53	
% mat loss during scan							3.00	3.53
4	61.31	246.11	246.11	245.62	245.33	245.15	239.40	
weight - pan		184.8	184.8	184.31	184.02	183.84	178.09	
diff from original weight			0	-0.49	-0.78	-0.96	-6.71	
diff from previous weight			0	-0.49	-0.29	-0.18	-5.75	
Est h2O loss		%H2O loss				-0.96	0.52	
% mat loss during scan							3.11	3.63
5	61.33	289.3	289.3	288.85	288.5	288.31	276.34	
weight - pan		227.97	227.97	227.52	227.17	226.98	215.01	
diff from original weight			0	-0.45	-0.8	-0.99	-12.96	
diff from previous weight			0	-0.45	-0.35	-0.19	-11.97	
Est h2O loss		%H2O loss				-0.99	0.43	
% mat loss during scan							5.25	5.68

	(mg)	stand dev
Mean start weight	202.13	16.50
Mean H20 gain	0.00	0.00
Mean H2O loss	-0.85	0.03
Mean change HC1	-0.51	0.05
Mean change HC2	-0.28	0.05
Mean change HC3	-0.21	0.04
Mean change scan	-8.78	2.85
Mean % loss scan	4.29	1.13
Mean % total loss	4.79	1.11

4MM

	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	
1	61.73	364.49	364.49	364.03	363.84	363.64	346.67	
weight - pan		302.76	302.76	302.3	302.11	301.91	284.94	
diff from original weight			0	-0.46	-0.65	-0.85	-17.82	
diff from previous weight			0	-0.46	-0.19	-0.2	-16.97	
est H2O loss		%H2O loss				-0.85	0.26	
% mat loss during scan							5.61	5.89
2	61.15	346.35	346.35	345.98	345.68	345.48	329.29	
weight - pan		285.2	285.2	284.83	284.53	284.33	268.14	
diff from original weight			0	-0.37	-0.67	-0.87	-17.06	
diff from previous weight			0	-0.37	-0.3	-0.2	-16.19	
Est h2O loss		%H2O loss				-0.87	0.31	
% mat loss during scan							5.68	5.98
3	61.8	363.51	363.51	363.16	362.82	362.58	346.10	
weight - pan		301.71	301.71	301.36	301.02	300.78	284.30	
diff from original weight			0	-0.35	-0.69	-0.93	-17.41	
diff from previous weight			0	-0.35	-0.34	-0.24	-16.48	
Est h2O loss		%H2O loss				-0.93	0.31	
% mat loss during scan							5.46	5.77
4	61.11	376.56	376.56	376.08	375.58	375.33	356.99	
weight - pan		315.45	315.45	314.97	314.47	314.22	295.88	
diff from original weight			0	-0.48	-0.98	-1.23	-19.57	
diff from previous weight			0	-0.48	-0.5	-0.25	-18.34	
Est h2O loss		%H2O loss				-1.23	0.39	
% mat loss during scan							5.81	6.20
5	62.15	358.75	358.75	358.37	358.18	357.93	341.41	
weight - pan		296.6	296.6	296.22	296.03	295.78	279.26	
diff from original weight			0	-0.38	-0.57	-0.82	-17.34	
diff from previous weight			0	-0.38	-0.19	-0.25	-16.52	
Est h2O loss		%H2O loss				-0.82	0.29	
% mat loss during scan							5.57	5.85

	(mg)	stand dev
Mean start weight	300.34	10.95
Mean H20 gain	0.00	0.00
Mean H2O loss	-0.83	0.17
Mean change HC1	-0.41	0.06
Mean change HC2	-0.30	0.13
Mean change HC3	-0.23	0.03
Mean change scan	-16.90	0.85
Mean % loss scan	5.63	0.13
Mean % total loss	5.94	0.17

Table 123. Photac-Fil Quick 24-Hour Thermal Weight Data

Photac-Fil Quick 24 Hour Thermal Weight Data Weights in mg

2mm	40 µl pan	ref pan weight	33.1								
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	31.71	106.75	107.31	106.29	105.9	105.55	101.22				
weight - pan		75.04	75.6	74.58	74.19	73.84	69.51				
diff from original weight			0.56	-0.46	-0.85	-1.2	-5.63				
diff from previous weight			0.56	-1.02	-0.39	-0.35	-4.33				
est H2O loss		%H2O loss				-1.76	2.33				
% mat loss during scan							5.73	8.06	1087.50	773.21	-360.83
2	30.92	107.73	109.02	108.23	107.74	107.48	103.25				
weight - pan		76.81	78.1	77.31	76.82	76.56	72.33				
diff from original weight			1.29	0.5	0.01	-0.25	-4.48				
diff from previous weight			1.29	-0.79	-0.49	-0.26	-4.23				
Est h2O loss		%H2O loss				-1.54	1.97				
% mat loss during scan							5.42	7.39	447.29	327.91	-1692.00
3	32.13	104.39	105.7	104.8	104.42	104.14	100.04				
weight - pan		72.26	73.57	72.67	72.29	72.01	67.91				
diff from original weight			1.31	0.41	0.03	-0.25	-4.35				
diff from previous weight			1.31	-0.9	-0.38	-0.28	-4.10				
Est h2O loss		%H2O loss				-1.56	2.12				
% mat loss during scan							5.57	7.69	432.06	312.98	-1640.00
4	31.98	127.82	129.23	128.28	127.87	127.5	122.27				
weight - pan		95.84	97.25	96.3	95.89	95.52	90.29				
diff from original weight			1.41	0.46	0.05	-0.32	-5.55				
diff from previous weight			1.41	-0.95	-0.41	-0.37	-5.23				
Est h2O loss		%H2O loss				-1.73	1.78				
% mat loss during scan							5.38	7.16	493.62	370.92	-1634.38
5	31.45	110.66	112	111.23	110.8	110.51	106.91				
weight - pan		79.21	80.55	79.78	79.35	79.06	75.46				
diff from original weight			1.34	0.57	0.14	-0.15	-3.75				
diff from previous weight			1.34	-0.77	-0.43	-0.29	-3.60				
Est h2O loss		%H2O loss				-1.49	1.85				
% mat loss during scan							4.47	6.32	379.85	268.66	-2400.00
3 mm	100 µl pan reference wt		63.74								
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.69	252.68	255.13	254.03	253.43	252.89	239.91				
weight - pan		190.99	193.44	192.34	191.74	191.2	178.22				
diff from original weight			2.45	1.35	0.75	0.21	-12.77				
diff from previous weight			2.45	-1.1	-0.6	-0.54	-12.98				
est H2O loss		%H2O loss				-2.24	1.16				
% mat loss during scan							6.71	7.87	621.22	529.80	6180.95
2	61.45	242.27	247.6	244.46	243.75	243.14	229.54				
weight - pan		180.82	186.15	183.01	182.3	181.69	168.09				
diff from original weight			5.33	2.19	1.48	0.87	-12.73				
diff from previous weight			5.33	-3.14	-0.71	-0.61	-13.60				
Est h2O loss		%H2O loss				-4.46	2.40				
% mat loss during scan							7.31	9.70	338.84	255.16	1563.22
3	62.08	247.55	251.48	249.78	249.09	248.64	235.16				
weight - pan		185.47	189.4	187.7	187.01	186.56	173.08				
diff from original weight			3.93	2.23	1.54	1.09	-12.39				
diff from previous weight			3.93	-1.7	-0.69	-0.45	-13.48				
Est h2O loss		%H2O loss				-2.84	1.50				
% mat loss during scan							7.12	8.62	415.27	343.00	1236.70
4	61.85	248.78	253.62	251.67	250.89	250.32	235.99				
weight - pan		186.93	191.77	189.82	189.04	188.47	174.14				
diff from original weight			4.84	2.89	2.11	1.54	-12.79				
diff from previous weight			4.84	-1.95	-0.78	-0.57	-14.33				
Est h2O loss		%H2O loss				-3.3	1.72				
% mat loss during scan							7.47	9.19	364.26	296.07	930.52
5	61.12	262.42	266.1	264.34	263.71	263.23	248.82				
weight - pan		201.3	204.98	203.22	202.59	202.11	187.70				
diff from original weight			3.68	1.92	1.29	0.81	-13.60				
diff from previous weight			3.68	-1.76	-0.63	-0.48	-14.41				
Est h2O loss		%H2O loss				-2.87	1.40				
% mat loss during scan							7.03	8.43	469.57	391.58	1779.01
4MM											
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.63	386.52	389.91	388.14	387.34	386.68	367.86				
weight - pan		324.89	328.28	326.51	325.71	325.05	306.23				
diff from original weight			3.39	1.62	0.82	0.16	-18.66				
diff from previous weight			3.39	-1.77	-0.8	-0.66	-18.82				
est H2O loss		%H2O loss				-3.23	0.98				
% mat loss during scan							5.73	6.72	650.44	555.16	11762.50
2	60.99	375.78	379.55	377.83	376.73	376.12	356.88				
weight - pan		314.79	318.56	316.84	315.74	315.13	295.89				
diff from original weight			3.77	2.05	0.95	0.34	-18.90				
diff from previous weight			3.77	-1.72	-1.1	-0.61	-19.24				
Est h2O loss		%H2O loss				-3.43	1.08				
% mat loss during scan							6.04	7.12	601.33	510.34	5658.82
3	61.31	334.76	341.2	337.99	336.94	336.24	316.96				
weight - pan		273.45	279.89	276.68	275.63	274.93	255.65				
diff from original weight			6.44	3.23	2.18	1.48	-17.80				
diff from previous weight			6.44	-3.21	-1.05	-0.7	-19.28				
Est h2O loss		%H2O loss				-4.96	1.77				
% mat loss during scan							6.89	8.66	376.40	299.38	1302.70
4	62.03	335.89	340.01	338.55	337.65	336.96	317.13				
weight - pan		273.86	277.98	276.52	275.62	274.93	255.10				
diff from original weight			4.12	2.66	1.76	1.07	-18.76				
diff from previous weight			4.12	-1.46	-0.9	-0.69	-19.83				
Est h2O loss		%H2O loss				-3.05	1.10				
% mat loss during scan							7.13	8.23	555.34	481.31	1853.27
5	61.39	355.21	358.87	357.2	356.32	355.77	337.26				
weight - pan		293.82	297.48	295.81	294.93	294.38	275.87				
diff from original weight			3.66	1.99	1.11	0.56	-17.95				
diff from previous weight			3.66	-1.67	-0.88	-0.55	-18.51				
Est h2O loss		%H2O loss				-3.1	1.04				
% mat loss during scan							6.22	7.26	590.44	505.74	3305.36

Table 124. Photac-Fil Quick One-Week Thermal Weight Data

Photac-Fil Quick 1 Week Thermal Weight Data					Weights in mg								
2mm	40 µl pan	ref pan weight		33.1	13-Oct-05								
		ref pan weight		33.07	20-Oct-05								
		pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O
	1	32.62	125.49		126.76	126.14	125.88	126.15	120.12				
	weight - pan		92.87		94.14	93.52	93.26	93.53	87.5				
	diff from original weight				1.27	0.65	0.39	0.66	-5.37				
	diff from previous weight				1.27	-0.62	-0.26	0.27	-6.03				
	est H2O loss		%H2O loss					-0.61	0.65				
	% mat loss during scan								6.41	7.05	522.83	474.80	913.64
	2	32.96	140.04		141.82	140.89	140.55	140.2	133.57				
	weight - pan		107.08		108.86	107.93	107.59	107.24	100.61				
	diff from original weight				1.78	0.85	0.51	0.16	-6.47				
	diff from previous weight				1.78	-0.93	-0.34	-0.35	-6.63				
	Est h2O loss		%H2O loss					-1.62	1.49				
	% mat loss during scan								6.09	7.58	463.48	372.47	4143.75
	3	32.8	127.3		128.93	127.93	127.62	127.27	121.92				
	weight - pan		94.5		96.13	95.13	94.82	94.47	89.12				
	diff from original weight				1.63	0.63	0.32	-0.03	-5.38				
	diff from previous weight				1.63	-1	-0.31	-0.35	-5.35				
	Est h2O loss		%H2O loss					-1.66	1.73				
	% mat loss during scan								5.57	7.29	430.06	328.22	-17833.33
	4	32.93	127.61		129.12	128.36	128.02	127.73	121.91				
	weight - pan		94.68		96.19	95.43	95.09	94.8	88.98				
	diff from original weight				1.51	0.75	0.41	0.12	-5.70				
	diff from previous weight				1.51	-0.76	-0.34	-0.29	-5.82				
	Est h2O loss		%H2O loss					-1.39	1.45				
	% mat loss during scan								6.05	7.50	477.48	385.43	4850.00
	5	32.64	122.31		123.84	122.91	122.51	122.12	116.78				
	weight - pan		89.67		91.2	90.27	89.87	89.48	84.14				
	diff from original weight				1.53	0.6	0.2	-0.19	-5.53				
	diff from previous weight				1.53	-0.93	-0.4	-0.39	-5.34				
	Est h2O loss		%H2O loss					-1.72	1.89				
	% mat loss during scan								5.86	7.74	461.44	349.02	-2810.53
3 mm	100 µl pan	reference wt		63.74	13-Oct-05								
		ref pan weight		63.88	20-Oct-05								
		pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
	1	63.26	236.38		239.36	238.48	237.98	237.51	226.03				
	weight - pan		173.12		176.1	175.22	174.72	174.25	162.77				
	diff from original weight				2.98	2.1	1.6	1.13	-10.35				
	diff from previous weight				2.98	-0.88	-0.5	-0.47	-11.48				
	est H2O loss		%H2O loss					-1.85	1.05				
	% mat loss during scan								6.52	7.57	447.32	385.23	1015.93
	2	63.71	261.84		264.76	264.12	263.55	263.19	250.46				
	weight - pan		198.13		201.05	200.41	199.84	199.48	186.75				
	diff from original weight				2.92	2.28	1.71	1.35	-11.38				
	diff from previous weight				2.92	-0.64	-0.57	-0.36	-12.73				
	Est h2O loss		%H2O loss					-1.57	0.78				
	% mat loss during scan								6.33	7.11	489.73	435.96	942.96
	3	64.58	250.03		252.82	252.04	251.46	251.11	238.60				
	weight - pan		185.45		188.24	187.46	186.88	186.53	174.02				
	diff from original weight				2.79	2.01	1.43	1.08	-11.43				
	diff from previous weight				2.79	-0.78	-0.58	-0.35	-12.51				
	Est h2O loss		%H2O loss					-1.71	0.91				
	% mat loss during scan								6.65	7.55	509.68	448.39	1158.33
	4	63.52	254.51		257.79	256.61	256.28	255.77	243.53				
	weight - pan		190.99		194.27	193.09	192.76	192.25	180.01				
	diff from original weight				3.28	2.1	1.77	1.26	-10.98				
	diff from previous weight				3.28	-1.18	-0.33	-0.51	-12.24				
	Est h2O loss		%H2O loss					-2.02	1.04				
	% mat loss during scan								6.30	7.34	434.76	373.17	971.43
	5	62.96	248.61		252.09	251.05	250.6	250.14	237.90				
	weight - pan		185.65		189.13	188.09	187.64	187.18	174.94				
	diff from original weight				3.48	2.44	1.99	1.53	-10.71				
	diff from previous weight				3.48	-1.04	-0.45	-0.46	-12.24				
	Est h2O loss		%H2O loss					-1.95	1.03				
	% mat loss during scan								6.47	7.50	407.76	351.72	800.00
4MM													
		pan empty	illed + cure		Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
	1	63.49	301.34		305.51	304.52	304.03	303.58	287.01				
	weight - pan		237.85		242.02	241.03	240.54	240.09	223.52				
	diff from original weight				4.17	3.18	2.69	2.24	-14.33				
	diff from previous weight				4.17	-0.99	-0.49	-0.45	-16.57				
	est H2O loss		%H2O loss					-1.93	0.80				
	% mat loss during scan								6.85	7.64	443.65	397.36	739.73
	2	64.36	296.24		300.1	299.21	298.66	298.25	282.70				
	weight - pan		231.88		235.74	234.85	234.3	233.89	218.34				
	diff from original weight				3.86	2.97	2.42	2.01	-13.54				
	diff from previous weight				3.86	-0.89	-0.55	-0.41	-15.55				
	Est h2O loss		%H2O loss					-1.85	0.78				
	% mat loss during scan								6.60	7.38	450.78	402.85	773.63
	3	63.94	294.26		298.04	297.13	296.59	296.12	279.93				
	weight - pan		230.32		234.1	233.19	232.65	232.18	215.99				
	diff from original weight				3.78	2.87	2.33	1.86	-14.33				
	diff from previous weight				3.78	-0.91	-0.54	-0.47	-16.19				
	Est h2O loss		%H2O loss					-1.92	0.82				
	% mat loss during scan								6.92	7.74	479.10	428.31	870.43
	4	63.2	302.01		305.78	304.8	304.18	303.79	288.36				
	weight - pan		238.81		242.58	241.6	240.98	240.59	225.16				
	diff from original weight				3.77	2.79	2.17	1.78	-13.65				
	diff from previous weight				3.77	-0.98	-0.62	-0.39	-15.43				
	Est h2O loss		%H2O loss					-1.99	0.82				
	% mat loss during scan								6.36	7.18	462.07	409.28	866.85
	5	63.45	300.19		303.72	302.73	302.35	301.92	286.22				
	weight - pan		236.74		240.27	239.28	238.9	238.47	222.77				
	diff from original weight				3.53	2.54	2.16	1.73	-13.97				
	diff from previous weight				3.53	-0.99	-0.38	-0.43	-15.70				
	Est h2O loss		%H2O loss					-1.8	0.75				
	% mat loss during scan								6.53	7.28	495.75	444.76	907.51

Table 125. Photac-Fil Quick One-Month Thermal Weight Data

Photac-Fil Quick 1 Month Thermal Weight Data Weights in mg

2mm 40 µl pan ref pan weight 33.12 mg 13-Oct-05
ref pan weight 33.13 13-Nov-05

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	33.21	130.15	131.28	130.59	130.23	129.97	123.87				
weight - pan		96.94	98.07	97.38	97.02	96.76	90.66				
diff from original weight			1.13	0.44	0.08	-0.18	-6.28				
diff from previous weight			1.13	-0.69	-0.36	-0.26	-6.10				
est H2O loss		%H2O loss				-1.31	1.34				
% mat loss during scan							6.22	7.56	655.75	539.82	-3388.89
2	32.56	123.81	125.48	124.54	124.02	123.78	118.54				
weight - pan		91.25	92.92	91.98	91.46	91.22	85.98				
diff from original weight			1.67	0.73	0.21	-0.03	-5.27				
diff from previous weight			1.67	-0.94	-0.52	-0.24	-5.24				
Est h2O loss		%H2O loss				-1.7	1.83				
% mat loss during scan							5.64	7.47	415.57	313.77	-17466.67
3	32.74	123.73	125.4	124.57	124.14	123.77	118.23				
weight - pan		90.99	92.66	91.83	91.4	91.03	85.49				
diff from original weight			1.67	0.84	0.41	0.04	-5.50				
diff from previous weight			1.67	-0.83	-0.43	-0.37	-5.54				
Est h2O loss		%H2O loss				-1.63	1.76				
% mat loss during scan							5.98	7.74	429.34	331.74	13850.00
4	33.4	141.69	143.81	142.82	142.38	142.1	134.90				
weight - pan		108.29	110.41	109.42	108.98	108.7	101.50				
diff from original weight			2.12	1.13	0.69	0.41	-6.79				
diff from previous weight			2.12	-0.99	-0.44	-0.28	-7.20				
Est h2O loss		%H2O loss				-1.71	1.55				
% mat loss during scan							6.52	8.07	420.28	339.62	1756.10
5	33.3	144.2	146.56	145.59	145.15	144.82	137.62				
weight - pan		110.9	113.26	112.29	111.85	111.52	104.32				
diff from original weight			2.36	1.39	0.95	0.62	-6.58				
diff from previous weight			2.36	-0.97	-0.44	-0.33	-7.20				
Est h2O loss		%H2O loss				-1.74	1.54				
% mat loss during scan							6.36	7.89	378.81	305.08	1161.29

3 mm 100 µl pan reference wt 63.45 15-Oct-05
ref pan weight 63.47 15-Nov-05

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	64.98	242.47	246.06	244.99	244.41	243.96	231.42				
weight - pan		177.49	181.08	180.01	179.43	178.98	166.44				
diff from original weight			3.59	2.52	1.94	1.49	-11.05				
diff from previous weight			3.59	-1.07	-0.58	-0.45	-12.54				
est H2O loss		%H2O loss				-2.1	1.16				
% mat loss during scan							6.93	8.08	407.80	349.30	841.61
2	62.37	243.25	246.73	245.8	245.24	244.91	232.29				
weight - pan		180.88	184.36	183.43	182.87	182.54	169.92				
diff from original weight			3.48	2.55	1.99	1.66	-10.96				
diff from previous weight			3.48	-0.93	-0.56	-0.33	-12.62				
Est h2O loss		%H2O loss				-1.82	0.99				
% mat loss during scan							6.85	7.83	414.94	362.64	760.24
3	64.07	246.88	250.38	249.43	249	248.75	235.97				
weight - pan		182.81	186.31	185.36	184.93	184.68	171.90				
diff from original weight			3.5	2.55	2.12	1.87	-10.91				
diff from previous weight			3.5	-0.95	-0.43	-0.25	-12.78				
Est h2O loss		%H2O loss				-1.63	0.87				
% mat loss during scan							6.86	7.73	411.71	365.14	683.42
4	63.4	259.55	263.13	262.26	261.76	261.41	248.12				
weight - pan		196.15	199.73	198.86	198.36	198.01	184.72				
diff from original weight			3.58	2.71	2.21	1.86	-11.43				
diff from previous weight			3.58	-0.87	-0.5	-0.35	-13.29				
Est h2O loss		%H2O loss				-1.72	0.86				
% mat loss during scan							6.65	7.52	419.27	371.23	714.52
5	62.93	249.33	253.05	252.12	251.75	251.42	238.52				
weight - pan		186.4	190.12	189.19	188.82	188.49	175.59				
diff from original weight			3.72	2.79	2.42	2.09	-10.81				
diff from previous weight			3.72	-0.93	-0.37	-0.33	-12.90				
Est h2O loss		%H2O loss				-1.63	0.86				
% mat loss during scan							6.79	7.64	390.59	346.77	617.22

4MM

	pan empty	illed + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	64.32	307.44	313.54	312	311.55	311.11	292.97				
weight - pan		243.12	249.22	247.68	247.23	246.79	228.65				
diff from original weight			6.1	4.56	4.11	3.67	-14.47				
diff from previous weight			6.1	-1.54	-0.45	-0.44	-18.14				
est H2O loss		%H2O loss				-2.43	0.98				
% mat loss during scan							7.28	8.25	337.21	297.38	494.28
2	64.12	304.29	309.23	307.79	307.33	306.93	289.03				
weight - pan		240.17	245.11	243.67	243.21	242.81	224.91				
diff from original weight			4.94	3.5	3.04	2.64	-15.26				
diff from previous weight			4.94	-1.44	-0.46	-0.4	-17.90				
Est h2O loss		%H2O loss				-2.3	0.94				
% mat loss during scan							7.30	8.24	408.91	362.35	678.03
3	64.09	307.15	311.87	310.97	310.43	310.03	292.72				
weight - pan		243.06	247.78	246.88	246.34	245.94	228.63				
diff from original weight			4.72	3.82	3.28	2.88	-14.43				
diff from previous weight			4.72	-0.9	-0.54	-0.4	-17.31				
Est h2O loss		%H2O loss				-1.84	0.74				
% mat loss during scan							6.99	7.73	405.72	366.74	601.04
4	63.53	307.53	312.42	311.45	310.89	310.44	292.76				
weight - pan		244	248.89	247.92	247.36	246.91	229.23				
diff from original weight			4.89	3.92	3.36	2.91	-14.77				
diff from previous weight			4.89	-0.97	-0.56	-0.45	-17.68				
Est h2O loss		%H2O loss				-1.98	0.80				
% mat loss during scan							7.10	7.90	402.04	361.55	607.56
5	63.75	303.05	306.44	305.99	305.63	305.23	287.95				
weight - pan		239.3	242.69	242.24	241.88	241.48	224.20				
diff from original weight			3.39	2.94	2.58	2.18	-15.10				
diff from previous weight			3.39	-0.45	-0.36	-0.4	-17.28				
Est h2O loss		%H2O loss				-1.21	0.50				
% mat loss during scan							7.12	7.62	545.43	509.73	792.66

Table 126. Photac-Fil Quick Three-Month Thermal Weight Data

Photac-Fil Quick 24 Hour Thermal Weight Data			Weights in mg								
2mm	40 µl pan	ref pan weight	33.1								
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan	Total%loss	Total/Gain%	Scan/Gain%	Scan/RetH2O%
1	31.71	106.75	107.31	106.29	105.9	105.55	101.22				
weight - pan		75.04	75.6	74.58	74.19	73.84	69.51				
diff from original weight			0.56	-0.46	-0.85	-1.2	-5.53				
diff from previous weight			0.56	-1.02	-0.39	-0.35	-4.33				
est H2O loss		%H2O loss				-1.76	2.33				
% mat loss during scan							5.73	8.06	1087.50	773.21	-360.83
2	30.92	107.73	109.02	108.23	107.74	107.48	103.25				
weight - pan		76.81	78.1	77.31	76.82	76.56	72.33				
diff from original weight			1.29	0.5	0.01	-0.25	-4.48				
diff from previous weight			1.29	-0.79	-0.49	-0.26	-4.23				
Est h2O loss		%H2O loss				-1.54	1.97				
% mat loss during scan							5.42	7.39	447.29	327.91	-1692.00
3	32.13	104.39	105.7	104.8	104.42	104.14	100.04				
weight - pan		72.26	73.57	72.67	72.29	72.01	67.91				
diff from original weight			1.31	0.41	0.03	-0.25	-4.35				
diff from previous weight			1.31	-0.9	-0.38	-0.28	-4.10				
Est h2O loss		%H2O loss				-1.56	2.12				
% mat loss during scan							5.57	7.69	432.06	312.98	-1640.00
4	31.98	127.82	129.23	128.28	127.87	127.5	122.27				
weight - pan		95.84	97.25	96.3	95.89	95.52	90.29				
diff from original weight			1.41	0.46	0.05	-0.32	-5.56				
diff from previous weight			1.41	-0.95	-0.41	-0.37	-5.23				
Est h2O loss		%H2O loss				-1.73	1.78				
% mat loss during scan							5.38	7.16	493.62	370.92	-1634.38
5	31.45	110.66	112	111.23	110.8	110.51	106.91				
weight - pan		79.21	80.55	79.78	79.35	79.06	75.46				
diff from original weight			1.34	0.57	0.14	-0.15	-3.75				
diff from previous weight			1.34	-0.77	-0.43	-0.29	-3.60				
Est h2O loss		%H2O loss				-1.49	1.85				
% mat loss during scan							4.47	6.32	379.85	268.66	-2400.00
3 mm	100 µl pan reference wt		63.74								
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.69	252.68	255.13	254.03	253.43	252.89	239.91				
weight - pan		190.99	193.44	192.34	191.74	191.2	178.22				
diff from original weight			2.45	1.35	0.75	0.21	-12.77				
diff from previous weight			2.45	-1.1	-0.6	-0.54	-12.98				
est H2O loss		%H2O loss				-2.24	1.16				
% mat loss during scan							6.71	7.87	621.22	529.80	6180.95
2	61.45	242.27	247.6	244.46	243.75	243.14	229.54				
weight - pan		180.82	186.15	183.01	182.3	181.69	168.09				
diff from original weight			5.33	2.19	1.48	0.87	-12.73				
diff from previous weight			5.33	-3.14	-0.71	-0.61	-13.60				
Est h2O loss		%H2O loss				-4.46	2.40				
% mat loss during scan							7.31	9.70	338.84	255.16	1563.22
3	62.08	247.55	251.48	249.78	249.09	248.64	236.16				
weight - pan		185.47	189.4	187.7	187.01	186.56	173.08				
diff from original weight			3.93	2.23	1.54	1.09	-12.39				
diff from previous weight			3.93	-1.7	-0.69	-0.45	-13.48				
Est h2O loss		%H2O loss				-2.84	1.50				
% mat loss during scan							7.12	8.62	415.27	343.00	1236.70
4	61.85	248.78	253.62	251.67	250.89	250.32	235.99				
weight - pan		186.93	191.77	189.82	189.04	188.47	174.14				
diff from original weight			4.84	2.89	2.11	1.54	-12.79				
diff from previous weight			4.84	-1.95	-0.78	-0.57	-14.33				
Est h2O loss		%H2O loss				-3.3	1.72				
% mat loss during scan							7.47	9.19	364.26	296.07	930.52
5	61.12	262.42	266.1	264.34	263.71	263.23	248.82				
weight - pan		201.3	204.98	203.22	202.59	202.11	187.70				
diff from original weight			3.68	1.92	1.29	0.81	-13.60				
diff from previous weight			3.68	-1.76	-0.63	-0.48	-14.41				
Est h2O loss		%H2O loss				-2.87	1.40				
% mat loss during scan							7.03	8.43	469.57	391.58	1779.01
4MM											
	pan empty	filled + cure	Pre HC	Post HC 1	Post HC 2	Post HC 3	Post Scan				
1	61.63	386.52	389.91	388.14	387.34	386.68	367.86				
weight - pan		324.89	328.28	326.51	325.71	325.05	306.23				
diff from original weight			3.39	1.62	0.82	0.16	-18.66				
diff from previous weight			3.39	-1.77	-0.8	-0.66	-18.82				
est H2O loss		%H2O loss				-3.23	0.98				
% mat loss during scan							5.73	6.72	650.44	555.16	11762.50
2	60.99	375.78	379.55	377.83	376.73	376.12	356.88				
weight - pan		314.79	318.56	316.84	315.74	315.13	295.89				
diff from original weight			3.77	2.05	0.95	0.34	-18.90				
diff from previous weight			3.77	-1.72	-1.1	-0.61	-19.24				
Est h2O loss		%H2O loss				-3.43	1.08				
% mat loss during scan							6.04	7.12	601.33	510.34	5658.82
3	61.31	334.76	341.2	337.99	336.94	336.24	316.96				
weight - pan		273.45	279.89	276.68	275.63	274.93	255.65				
diff from original weight			6.44	3.23	2.18	1.48	-17.80				
diff from previous weight			6.44	-3.21	-1.05	-0.7	-19.28				
Est h2O loss		%H2O loss				-4.96	1.77				
% mat loss during scan							6.89	8.66	376.40	299.38	1302.70
4	62.03	335.89	340.01	338.55	337.65	336.96	317.13				
weight - pan		273.86	277.98	276.52	275.62	274.93	255.10				
diff from original weight			4.12	2.66	1.76	1.07	-18.76				
diff from previous weight			4.12	-1.46	-0.9	-0.69	-19.83				
Est h2O loss		%H2O loss				-3.06	1.10				
% mat loss during scan							7.13	8.23	555.34	481.31	1853.27
5	61.39	355.21	358.87	357.2	356.32	355.77	337.26				
weight - pan		293.82	297.48	295.81	294.93	294.38	275.87				
diff from original weight			3.66	1.99	1.11	0.56	-17.95				
diff from previous weight			3.66	-1.67	-0.88	-0.55	-18.51				
Est h2O loss		%H2O loss				-3.1	1.04				
% mat loss during scan							6.22	7.26	590.44	505.74	3305.36